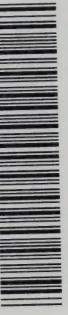



3 1761 11554535 2





Digitized by the Internet Archive
in 2022 with funding from
University of Toronto

<https://archive.org/details/31761115545352>

CAI FR 12

17P61D

NATIVE TREES OF CANADA

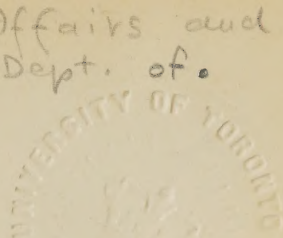
9347m

A



Gov. Doc
Can
N

Canada Northern Affairs and
National Resources, Dept. of.
Forestry Branch



NATIVE TREES OF CANADA

BULLETIN

61

FIFTH EDITION



CANADA

Canada
Department of Northern Affairs and National Resources
FORESTRY BRANCH

I

200.105-2
N

LIBRARY OF THE
PARLIAMENT OF CANADA

NATIVE TREES OF CANADA

Bulletin No. 61

					Quantity
FIRST EDITION . . .	1917				6,000
REPRINTED	1921				5,000
SECOND EDITION . .	1933				3,000
FRENCH EDITION . .	1937				3,000
N.F.P. EDITION . . .	1939				4,000
THIRD EDITION . . .	1939				5,000
FOURTH EDITION . .	1949				25,000
REPRINTED	1950				20,000
FIFTH EDITION . . .	1956				20,000

●

Price—One dollar and fifty cents

●

640481
15.8.56

OTTAWA

EDMOND CLOUTIER, C.M.G., B.A., L.Ph.,

QUEEN'S PRINTER AND CONTROLLER OF STATIONERY

1956

Contents

	Page
FOREWORD	VII
NOMENCLATURE	IX
BOTANICAL AUTHORS	XI
CHECKLIST OF THE NATIVE TREES OF CANADA . .	XIII
PART I—CONIFEROUS TREES	1
The YEWS	2
The PINES	4
The LARCHES	26
The SPRUCES	34
The HEMLOCKS	48
The DOUGLAS FIRS	56
The FIRS	62
The ARBOR-VITAE	72
The CHAMAECYPARIS	78
The JUNIPERS	80
PART II—BROAD-LEAVED TREES	87
The POPLARS	88
The WILLOWS	106
The WALNUTS	108
The HICKORIES	114
The BLUE-BEECHES	124
The IRONWOODS	126
The BIRCHES	128
The ALDERS	142
The BEECHES	154
The CHESTNUTS	156
The OAKS	158
The ELMS	180
The HACKBERRIES	188
The MULBERRIES	190
The MAGNOLIAS	192
The TULIP-TREES	194
The PAPAWS	196
The SASSAFRASES	198
The WITCH-HAZELS	200

Contents Cont'd

	Page
The SYCAMORES	202
The APPLES	204
The MOUNTAIN-ASHES	206
The SERVICEBERRIES	212
The HAWTHORNS	214
The CHERRIES and PLUMS	216
The REDBUDS	230
The HONEY-LOCUSTS	232
The COFFEE-TREES	234
The HOP-TREES	236
The SUMACS	238
The MAPLES	240
The BUCKTHORNS	262
The BASSWOODS	264
The TUPELOS	266
The DOGWOODS	268
The MADRONES	270
The ASHES	272
The ELDERS	284
INDEX	286
PLATES- RED MAPLE LEAVES	Frontispiece
SUGAR MAPLE TREE	V
PONDEROSA PINE	XVIII
EASTERN HARDWOODS	86



ACKNOWLEDGMENTS

Acknowledgment is made to the following sources
for illustrative material:—

BRITISH COLUMBIA FOREST SERVICE

Ponderosa pine tree
Shore pine tree
Western larch tree
Western larch bark
Alpine fir bark
Amabilis fir bark
Rocky Mountain juniper tree
Western white birch bark

NATIONAL MUSEUM OF CANADA

Black walnut tree
Black gum tree
White oak trees

NATIONAL PARKS SERVICE

Jacket photograph

Foreword

NATIVE TREES of Canada is intended as a popular publication describing the occurrence and characteristics of Canadian tree species. Its chief purpose is to provide a means for the layman to become acquainted with the trees of his neighbourhood and thus foster an interest in forestry, and what the forest means to Canadians. In order that the publication may be of most use to those not familiar with the specialized terminology of the botanist, technical terms are used as little as possible, and the descriptions are confined to the more easily recognized characteristics.

The first three editions of *Native Trees of Canada* appearing in 1917, 1933, and 1939 were based upon the work of B. R. Morton, and R. G. Lewis, with some later revision by G. A. Mulloy. In the fourth edition, completed in 1949, the format was modernized, and major changes made in the descriptive material and range maps; photographs, usually taken against a one-inch background grid to show the scale, replaced the earlier line drawings illustrating botanical features.

In this, the fifth edition of *Native Trees of Canada*, the format of the previous edition has been preserved and a number of revisions made to include the considerable amount of new information which had been collected, particularly with regard to the distribution of several species. A description of rooting habits has been incorporated wherever such information was available. Unfortunately, knowledge of this characteristic is lacking for most species. As in previous editions, the economic uses for the different species have been indicated in brief statements; more detailed information on this aspect can be obtained from "*Canadian Woods*", also published by the Forestry Branch.

The text and range maps used in both the fourth and fifth editions were prepared by G. C. Cunningham of the Forest Research Division, and

with a few exceptions as noted elsewhere, the photographs were taken by J. W. Summers of the Forest Products Laboratories Division of the Forestry Branch.

In producing a publication of the magnitude of *Native Trees of Canada* it is necessary to draw upon the services of many specialists including foresters, botanists, editors, and artists. The Forestry Branch acknowledges the debt it owes these individuals. For providing botanical specimens and for other assistance, thanks are due to the officials of the British Columbia Forest Service; the Ontario Department of Lands and Forests; the Division of Botany and Plant Pathology, Canada Department of Agriculture; and the National Herbarium of Canada.

D. A. MACDONALD,
Director of Forestry.

Nomenclature

Every tree has a botanical name and one or more common names. Botanical names are coined by botanists who, when they discover a new kind of tree, give it a name and prepare a description of its outstanding characteristics. Common names originate with the people who come into contact with the trees as they live and work among them.

Botanical names are always written in Latin, a dead language whose grammatical rules do not change with the passage of time; it is the universal language of science. These names are recognized throughout the world, and under the International Code of Botanical Nomenclature the same name can never be correctly applied to more than one tree. If two or more botanical names are applied to the same tree, the oldest correct name has priority.

A botanical name has at least two parts, a generic name and a specific name. The generic name is applicable to a group of trees, all having common characteristics. It is always written with a capital letter. The specific name refers to the particular species of tree in the group, and the varietal name to small differences within the species. In formal writing, the name of the person or persons (usually abbreviated) who first described the tree correctly is placed after the specific name. The varietal name, if used, is placed after the name of the author of the specific name. It is followed by the name of its author and is usually preceded by the abbreviation "var." for variety. Under the rules, specific and varietal names may be capitalized when they have been derived from the name of a person but the Forestry Branch has abandoned this practice because it was a source of confusion. Generic, specific, and varietal names are usually printed in italic type.

The layman, however, rarely uses the botanical names. Instead he uses the common names which naturally vary in the different languages. Thus members of the genus *Acer* are known as 'maple' in English and 'érable' in French. Even in the same language the common name of a particular tree often varies with locality. Likewise a common name that in one locality is always applied to a certain tree may in another locality be applied to an entirely different tree. One of the purposes of this manual is to supply a standard of reference which can be used anywhere in Canada. In the text the local names are shown in smaller type than the official English common name.

The principle followed by the Forestry Branch in selecting the common English and French names for official usage is to adopt the name in most general use in Canada, unless there is some good reason for adopting another. The use of the name 'cedar' illustrates this point. Both the arbor-vitae and the junipers are commonly called 'cedar' although there are no true cedars in Canada. However, the two species of arbor-vitae, *Thuja occidentalis* and

T. plicata, have larger geographical ranges and are much more important commercially than the two junipers, *Juniperus virginiana* and *J. scopulorum*. Accordingly the Canadian arbor-vitae have been designated as the eastern white cedar and the western red cedar respectively, while the two junipers are known as red juniper and Rocky Mountain juniper.

Preference has been given, in the choice of common names for some of the trees, to names which are translations of the scientific name as in the case of limber pine, *Pinus flexilis*. In other cases the adjectives 'eastern' and 'western' have been added to differentiate species which are found in only one part of the country, e.g., eastern hemlock, western white pine, etc., although these adjectives would not be in common use in the region where the tree is found.

In addition to the inclusion of a number of new species and varieties, the following changes in botanical names should be noted:—

FORMER NAME	PRESENT NAME
<i>Picea rubra</i>	<i>Picea rubens</i>
<i>Acer pennsylvanicum</i>	<i>Acer pennsylvanicum</i>
<i>Alnus incana</i>	<i>Alnus rugosa</i> var. <i>americana</i>
<i>Amelanchier canadensis</i>	<i>Amelanchier arborea</i>
<i>Betula fontinalis</i>	<i>Betula occidentalis</i>
<i>Betula papyrifera</i> var. <i>occidentalis</i>	<i>Betula papyrifera</i> var. <i>commutata</i>
<i>Betula neoalaskana</i>	<i>Betula papyrifera</i> var. <i>humilis</i>
<i>Carpinus caroliniana</i>	<i>Carpinus caroliniana</i> var. <i>virginiana</i>
<i>Carya alba</i>	<i>Carya tomentosa</i>
<i>Cornus asperifolia</i>	<i>Cornus drummondi</i>
<i>Cornus nuttallii</i>	<i>Cornus nuttallii</i>
<i>Fraxinus pennsylvanica</i> var. <i>lanceolata</i>	<i>Fraxinus pennsylvanica</i> var. <i>subintegerrima</i>
<i>Gymnocladus dioicus</i>	<i>Gymnocladus dioica</i>
<i>Populus tacamahacca</i>	<i>Populus balsamifera</i>
<i>Prunus pennsylvanica</i>	<i>Prunus pennsylvanica</i>
<i>Quercus borealis</i>	<i>Quercus rubra</i>
<i>Quercus montana</i>	<i>Quercus prinus</i>
<i>Quercus muehlenbergii</i>	<i>Quercus muehlenbergii</i>
<i>Tilia glabra</i>	<i>Tilia americana</i>
<i>Ulmus fulva</i>	<i>Ulmus rubra</i>
<i>Ulmus thomasi</i>	<i>Ulmus thomasi</i>

Dwarf maple	Douglas maple
Aspen	Trembling aspen
Mountain birch	Water birch
Madrona	Arbutus
Alaska birch	Alaska white birch

Botanical Authors

ABBREVIATION

NAME

Adans.	Michel Adanson
Ait.	William Aiton
Anderss.	Nils Johan Andersson
Ashe	William Willard Ashe
Audubon	John James Audubon
Ball	Carlton Roy Ball
Barratt	Joseph Barratt
Bartr.	William Bartram
Benth.	George Bentham
Blanch.	William Henry Blanchard
Borkh.	Moritz Balthasar Borkhausen
Britt.	Nathaniel Lord Britton
Brown, S.	Stewardson-Brown
BSP.	N. L. Britton; Emerson Ellick Sterns; Justus Ferdinand Poggenberg
Carr.	Elie Abel Carrière
Cov.	Frederick Vernon Coville
D.C.	Augustin Pyramas de Candolle
Dietr., A.	Albert Dietrich
Dietr., D.	David Nathanael Friedrich Dietrich
Dipp.	Ludwig Dippel
Dode	Louis Albert Dode
Don, D.	David Don
Donn	James Donn
Dougl.	David Douglas
Dunal	Michel Félix Dunal
Du Roi	Johann Philipp Du Roi
Ehrh.	Friedrich Ehrhart
Ehrh., B.	Balthasar Ehrhart
Endl.	Stephan Ladislaus Endlicher
Engelm.	George Engelmann
Evans	W. H. Evans
Fern.	Merrit Lyndon Fernald
Forb.	James Forbes
Heller	Amos Arthur Heller
Hill, E. J.	Ellsworth Jerome Hill

Hook.	William Jackson Hooker
Howell	Thomas Howell
James	Edwin James
Koch, K.	Karl Heinrich Emil Koch
L.	Carl von Linné (Linnaeus)
L. f.	Carl von Linné, the son
Lam.	Jean Baptiste Antoine Pierre Monnet Lamarck
Lamb.	Aylmer Bourke Lambert
Laws.	Lawson & Son
Lindl.	John Lindley
Loud.	John Claudius Loudon
Marsh.	Humphrey Marshall
Mayr	Heinrich Mayr
Medic.	Friedrich Casimir Medicus
Mey., C. A.	Carl (Karl) Anton Meyer
Michx.	André Michaux
Michx. f.	François André Michaux, the son
Mill.	Philip Miller
Moench	Konrad Moench
Muenchh.	Otto von Muenchhausen
Muhl.	Henry Ludwig Muhlenberg
Nees	Christian Gottfried Nees von Esenbeck
Nels., A.	Aven Nelson
Nutt.	Thomas Nuttall
Parl.	Filippo Parlatore
Parry	Charles Christopher Parry
Poir.	Jean Louis Marie Poiret
Pursh	Frederick Pursh
Raf.	Constantino Samuel Rafinesque-Schmaltz
Raup	Hugh Miller Raup
Regel	Edward August von Regel
Rehd.	Alfred Rehder
Rowlee	Willard Winfield Rowlee
Rydb.	Per Axel Rydberg
Sarg.	Charles Sprague Sargent
Schneid.	Camillo (Karl) Schneider
Scop.	Giovanni Antonio Scopoli
Spach	Edouard Spach
Spreng.	Kurt Sprengel
Sudw.	George Bishop Sudworth
Sweet	Robert Sweet
Torr.	John Torrey
Torr. & Gray	J. Torrey and A. Gray
Trew	Christoph Jacob Trew
Voss	Andreas Voss
Walt.	Thomas Walter
Wangh.	Friedrich Adam Julius von Wangenheim
Wieg.	Karl McKay Wiegand
Willd.	Karl Ludwig Willdenow

CHECKLIST OF THE NATIVE TREES OF CANADA

CONIFEROUS TREES

Botanical Name	English Name	French Name	Page
ABIES Mill.			
<i>Abies amabilis</i> (Dougl.) Forb.	Amabilis fir	Sapin gracieux	68
<i>Abies balsamea</i> (L.) Mill.	Balsam fir	Sapin baumier	64
<i>Abies balsamea</i> (L.) Mill. var. <i>phanerolepis</i> Fern.	Bracted balsam fir	Sapin baumier var. à bractées	64
<i>Abies grandis</i> (Dougl.) Lindl.	Grand fir	Sapin grandissime	70
<i>Abies lasiocarpa</i> (Hook.) Nutt.	Alpine fir	Sapin concolore	66
CHAMAECYPARIS Spach			
<i>Chamaecyparis nootkatensis</i> (D. Don) Spach	Yellow cedar	Cypres jaune	78
JUNIPERUS L.			
<i>Juniperus scopulorum</i> Sarg.	Rocky Mountain juniper	Genévrier des Montagnes Rocheuses	84
<i>Juniperus virginiana</i> L.	Red juniper	Genévrier rouge	82
LARIX Mill.			
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	Mélèze laricin	28
<i>Larix laricina</i> (Du Roi) K. Koch var. <i>alaskensis</i> (Wight) Raup	Alaska larch	Mélèze d'Alaska	28
<i>Larix lyallii</i> Parl	Alpine larch	Mélèze de Lyall	32
<i>Larix occidentalis</i> Nutt.	Western larch	Mélèze occidental	30
PICEA A. Dietr.			
<i>Picea engelmanni</i> Parry	Engelmann spruce	Epinette d'Engelmann	44
<i>Picea glauca</i> (Moench) Voss	White spruce	Epinette blanche	36
<i>Picea glauca</i> (Moench) Voss var. <i>albertiana</i> (S. Brown) Sarg.	Western white spruce	Epinette blanche de l'Ouest	38
<i>Picea glauca</i> (Moench) Voss var. <i>porsildii</i> Raup	Porsild spruce	Epinette de Porsild	36
<i>Picea mariana</i> (Mill.) BSP.	Black spruce	Epinette noire	40
<i>Picea rubens</i> Sarg.	Red spruce	Epinette rouge	42
<i>Picea sitchensis</i> (Bong.) Carr.	Sitka spruce	Epinette de Sitka	46
PINUS L.			
<i>Pinus albicaulis</i> Engelm.	Whitebark pine	Pin à blanche écorce	10
<i>Pinus banksiana</i> Lamb.	Jack pine	Pin gris	16
<i>Pinus contorta</i> Dougl.	Shore pine	Pin à feuilles tordues	22
<i>Pinus contorta</i> Dougl. var. <i>latifolia</i> Engelm.	Lodgepole pine	Pin de Murray	24
<i>Pinus flexilis</i> James	Limber pine	Pin blanc de l'Ouest	12
<i>Pinus monticola</i> Dougl.	Western white pine	Pin argenté	8
<i>Pinus ponderosa</i> Laws.	Ponderosa pine	Pin à bois lourd	20
<i>Pinus resinosa</i> Ait.	Red pine	Pin rouge	14
<i>Pinus rigida</i> Mill.	Pitch pine	Pin dur	18
<i>Pinus strobus</i> L.	Eastern white pine	Pin blanc	6
PSEUDOTSUGA Carr.			
<i>Pseudotsuga taxifolia</i> (Poir.) Britt.	Douglas fir	Sapin de Douglas	58
<i>Pseudotsuga taxifolia</i> (Poir.) Britt. var. <i>glauca</i> (Mayr) Sudw.	Blue Douglas fir	Sapin de Douglas var. des Montagnes Rocheuses	60
TAXUS L.			
<i>Taxus brevifolia</i> Nutt.	Western yew	If occidental	2
THUJA L.			
<i>Thuja occidentalis</i> L.	Eastern white cedar	Thuya de l'Est	74
<i>Thuja plicata</i> Donn	Western red cedar	Thuya géant	76
TSUGA (Endl.) Carr.			
<i>Tsuga canadensis</i> (L.) Carr.	Eastern hemlock	Pruche de l'Est	50
<i>Tsuga heterophylla</i> (Raf.) Sarg.	Western hemlock	Pruche de l'Ouest	52
<i>Tsuga mertensiana</i> (Bong.) Carr.	Mountain hemlock	Tsuga de Patton	54

BROAD-LEAVED TREES

Botanical Name	English Name	French Name	Page
ACER L.			
<i>Acer circinatum</i> Pursh	Vine maple	Erable circiné	248
<i>Acer glabrum</i> Torr. var. <i>dasycarpum</i> (Hook.) Dipp.	Douglas maple	Erable nain	246
<i>Acer macrophyllum</i> Pursh	Broadleaf maple	Erable à grandes feuilles	250
<i>Acer negundo</i> L.	Manitoba maple	Erable négondo	260
<i>Acer negundo</i> L. var. <i>interius</i> (Britt.) Sarg.	Inland Manitoba maple	Erable négondo var. de l'intérieur	260
<i>Acer nigrum</i> Michx. f.	Black maple	Erable noir	254
<i>Acer pensylvanicum</i> L.	Striped maple	Erable de Pennsylvanie	244
<i>Acer rubrum</i> L.	Red maple	Erable rouge	256
<i>Acer saccharinum</i> L.	Silver maple	Erable argenté	258
<i>Acer saccharum</i> Marsh.	Sugar maple	Erable à sucre	252
<i>Acer spicatum</i> Lam.	Mountain maple	Erable à épis	242
ALNUS B. Ehrh.			
<i>Alnus rhombifolia</i> Nutt.	White alder	Aune blanc	148
<i>Alnus rubra</i> Bong.	Red alder	Aune de l'Orégon	146
<i>Alnus rugosa</i> (Du Roi) Spreng. var. <i>americana</i> (Regel) Fern.	Speckled alder	Aune commun	144
<i>Alnus sinuata</i> (Regel) Rydb.	Sitka alder	Aune de Sitka	152
<i>Alnus tenuifolia</i> Nutt.	Mountain alder	Aune à feuilles minces	150
AMELANCHIER Medic.			
<i>Amelanchier alnifolia</i> Nutt.	Saskatoon	Amélanchier à feuilles d'aune	212
<i>Amelanchier arborea</i> (Michx.f.) Fern.	Downy serviceberry	Amélanchier du Canada	212
<i>Amelanchier florida</i> Lindl.	Pacific serviceberry	Amélanchier de l'Ouest	212
<i>Amelanchier laevis</i> Wieg.	Allegheny serviceberry	Amélanchier glabre	212
ARBUTUS L.			
<i>Arbutus menziesii</i> Pursh	Arbutus	Arbousier de Menzies	270
ASIMINA Adans.			
<i>Asimina triloba</i> (L.) Dunal	Papaw	Asiminier trilobé	196
BETULA L.			
<i>Betula caerulea-grandis</i> Blanch.	Blueleaf birch	Bouleau bleu	138
<i>Betula kenaica</i> Evans	Kenai birch	Bouleau Kenai	128
<i>Betula lenta</i> L.	Sweet birch	Bouleau flexible	132
<i>Betula lutea</i> Michx. f.	Yellow birch	Bouleau jaune	130
<i>Betula occidentalis</i> Hook.	Water birch	Bouleau fontinal	140
<i>Betula papyrifera</i> Marsh.	White birch	Bouleau à papier	134
<i>Betula papyrifera</i> Marsh. var. <i>commutata</i> (Regel) Fern.	Western white birch	Bouleau occidental	136
<i>Betula papyrifera</i> Marsh. var. <i>cordifolia</i> (Regel) Fern.	Mountain white birch	Bouleau à papier var. à feuilles cordées	134
<i>Betula papyrifera</i> Marsh. var. <i>elobata</i> (Fern.) Sarg.	Gaspé white birch	Bouleau à papier var. à fruits non lobés	134
<i>Betula papyrifera</i> Marsh. var. <i>humilis</i> (Regel) Fern. & Raup	Alaska white birch	Bouleau d'Alaska	134
<i>Betula papyrifera</i> Marsh. var. <i>macrostachya</i> Fern.	Large-fruited white birch	Bouleau à papier var. à gros épis	134
<i>Betula papyrifera</i> Marsh. var. <i>pensilis</i> Fern.	Weeping white birch	Bouleau à papier var. à épis retombants	134
<i>Betula papyrifera</i> Marsh. var. <i>subcordata</i> (Rydb.) Sarg.	Northwestern white birch	Bouleau à papier var. à feuilles subcordées	136
<i>Betula populifolia</i> Marsh.	Wire birch	Bouleau à feuilles de peuplier	138
CARPINUS L.			
<i>Carpinus caroliniana</i> Walt. var. <i>virginiana</i> (Marsh.) Fern.	Blue-beech	Charme de Caroline var. de Virginie	124

Botanical Name	English Name	French Name	Page
CARYA Nutt.			
<i>Carya cordiformis</i> (Wang.) K. Koch	Bitternut hickory	Caryer cordiforme	116
<i>Carya glabra</i> (Mill.) Sweet	Pignut hickory	Caryer glabre	120
<i>Carya laciniosa</i> (Michx. f.) Loud.	Shellbark hickory	Caryer à folioles denticulées	114
<i>Carya ovalis</i> (Wang.) Sarg. var. <i>odorata</i> (Marsh.) Sarg.	Roundnut red hickory	Caryer à feuilles glanduleuses	114
<i>Carya ovata</i> (Mill.) K. Koch	Shagbark hickory	Caryer à fruits doux	118
<i>Carya ovata</i> (Mill.) K. Koch var. <i>fraxinifolia</i> Sarg.	Ashleaf shagbark hickory	Caryer à feuilles de frêne	118
<i>Carya tomentosa</i> Nutt.	Mockernut hickory	Caryer tomenteux	122
CASTANEA Mill.			
<i>Castanea dentata</i> (Marsh.) Borkh.	Chestnut	Châtaignier d'Amérique	156
CELTIS L.			
<i>Celtis occidentalis</i> L.	Hackberry	Micocoulier occidental	188
CERCIS L.			
<i>Cercis canadensis</i> L.	Redbud	Gainier du Canada	230
CORNUS L.			
<i>Cornus alternifolia</i> L. f.	Alternate-leaf dogwood	Cornouiller à feuilles alternes	268
<i>Cornus drummondii</i> C. A. Mey.	Roughleaf dogwood	Cornouiller de Drummond	268
<i>Cornus florida</i> L.	Eastern flowering dogwood	Cornouiller de la Floride	268
<i>Cornus nuttalli</i> Audubon	Western flowering dogwood	Cornouiller de Nuttall	268
CRATAEGUS L.			
<i>Crataegus chryscarpa</i> Ashe	Roundleaf hawthorn	Aubépine à fruits jaunâtres	214
<i>Crataegus columbiana</i> Howell	Columbia hawthorn	Aubépine de la Colombie	214
<i>Crataegus douglasii</i> Lindl.	Black hawthorn	Aubépine noir	214
FAGUS L.			
<i>Fagus grandifolia</i> Ehrh.	Beech	Hêtre à grandes feuilles	154
FRAXINUS L.			
<i>Fraxinus americana</i> L.	White ash	Frêne d'Amérique	274
<i>Fraxinus nigra</i> Marsh.	Black ash	Frêne noir	276
<i>Fraxinus pennsylvanica</i> Marsh.	Red ash	Frêne de Pennsylvanie	280
<i>Fraxinus pennsylvanica</i> Marsh. var. <i>austini</i> Fern.	Northern red ash	Frêne de Pennsylvanie var. du Nord	280
<i>Fraxinus pennsylvanica</i> Marsh. var. <i>subintegerrima</i> (Vahl.) Fern.	Green ash	Frêne vert	282
<i>Fraxinus quadrangulata</i> Michx.	Blue ash	Frêne anguleux	278
GLEDITSIA L.			
<i>Gleditsia triacanthos</i> L.	Honey-locust	Févier à trois épines	232
GYMNOCLADUS Lam.			
<i>Gymnocladus dioica</i> (L.) K. Koch	Kentucky coffee-tree	Chicot du Canada	234
HAMAMELIS L.			
<i>Hamamelis virginiana</i> L.	Witch-hazel	Hamamélis de Virginie	200
JUGLANS L.			
<i>Juglans cinerea</i> L.	Butternut	Noyer cendré	110
<i>Juglans nigra</i> L.	Black walnut	Noyer noir d'Amérique	112
LIRIODENDRON L.			
<i>Liriodendron tulipifera</i> L.	Tulip-tree	Tulipier	194
MAGNOLIA L.			
<i>Magnolia acuminata</i> L.	Cucumber-tree	Magnolia à feuilles acuminées	192

Botanical Name	English Name	French Name	Page
MALUS Mill.			
<i>Malus coronaria</i> (L.) Mill.	Sweet crab apple	Pomettier coronarie	204
<i>Malus fusca</i> (Raf.) Schneid.	Pacific crab apple	Pomettier du Pacifique	204
MORUS L.			
<i>Morus rubra</i> L.	Red mulberry	Mûrier rouge	190
NYSSA L.			
<i>Nyssa sylvatica</i> Marsh.	Black gum	Nyssa sylvestre	266
OSTRYA Scop.			
<i>Ostrya virginiana</i> (Mill.) K. Koch	Ironwood	Ostryer de Virginie	126
PLATANUS L.			
<i>Platanus occidentalis</i> L.	Sycamore	Plantane d'Occident	202
POPULUS L.			
<i>Populus acuminata</i> Rydb.	Lanceleaf cottonwood	Peuplier à feuilles acuminées	104
<i>Populus angustifolia</i> James	Narrowleaf cottonwood	Peuplier à feuilles étroites	102
<i>Populus balsamifera</i> L.	Balsam poplar	Peuplier baumier	94
<i>Populus deltoides</i> Marsh.	Eastern cottonwood	Peuplier à feuilles deltoïdes	98
<i>Populus grandidentata</i> Michx.	Largetooth aspen	Peuplier à grandes dents	92
<i>Populus sargentii</i> Dode	Plains cottonwood	Peuplier de Sargent	100
<i>Populus tremuloides</i> Michx.	Trembling aspen	Peuplier faux-tremble	90
<i>Populus trichocarpa</i> Torr. and Gray	Black cottonwood	Peuplier de l'Ouest	96
PRUNUS L.			
<i>Prunus americana</i> Marsh.	Wild plum	Prunier d'Amérique	228
<i>Prunus emarginata</i> (Dougl.) D. Dietr.	Bitter cherry	Cerisier amer	224
<i>Prunus nigra</i> Ait.	Canada plum	Prunier noir	226
<i>Prunus pensylvanica</i> L.f.	Pin cherry	Cerisier de Pennsylvanie	220
<i>Prunus serotina</i> Ehrh.	Black cherry	Cerisier tardif	218
<i>Prunus virginiana</i> L.	Choke cherry	Cerisier de Virginie	222
<i>Prunus virginiana</i> L. var. <i>demissa</i> (Nutt.) Torr.	Western choke cherry	Cerisier sauvage de l'Ouest	222
<i>Prunus virginiana</i> L. var. <i>melanocarpa</i> (A. Nels.) Sarg.	Black choke cherry	Cerisier à fruits noirs	222
PTELEA L.			
<i>Ptelea trifoliata</i> L.	Hop-tree	Ptéleá trifolié	236
QUERCUS L.			
<i>Quercus alba</i> L.	White oak	Chêne blanc	160
<i>Quercus bicolor</i> Willd.	Swamp white oak	Chêne bicolore	164
<i>Quercus coccinea</i> Muenchh.	Scarlet oak	Chêne écarlate	176
<i>Quercus ellipsoidalis</i> E. J. Hill	Northern pin oak	Chêne des marais du Nord	178
<i>Quercus garryana</i> Dougl.	Garry oak	Chêne de Garry	170
<i>Quercus macrocarpa</i> Michx.	Bur oak	Chêne à gros fruits	162
<i>Quercus muehlenbergii</i> Engelm.	Chinquapin oak	Chêne à chinquapin	168
<i>Quercus palustris</i> Muenchh.	Pin oak	Chêne des marais	178
<i>Quercus prinus</i> L.	Chestnut oak	Chêne prin	166
<i>Quercus rubra</i> L.	Red oak	Chêne rouge	172
<i>Quercus velutina</i> Lam.	Black oak	Chêne des teinturiers	174
RHAMNUS L.			
<i>Rhamnus purshiana</i> DC.	Cascara	Nerprun de Pursh	262
RHUS L.			
<i>Rhus typhina</i> L.	Staghorn sumac	Sumac vinaigrier	238
SALIX L.			
<i>Salix alaxensis</i> (Anderss.) Cov.	Feltleaf willow	Saule feutré	
<i>Salix amygdaloides</i> Anderss.	Peachleaf willow	Saule à feuilles de pêcher	106
<i>Salix bebbiana</i> Sarg.	Bebb willow	Saule de Bebb	
<i>Salix caudata</i> (Nutt.) Heller	Whiplash willow	Saule caudé	

Botanical Name	English Name	French Name	Page
SALIX L. (Continued)			
<i>Salix coulteri</i> Anderss.	Coulter willow	Saule de Coulter	106
<i>Salix discolor</i> Muhl.	Pussy willow	Saule discoloré	
<i>Salix exigua</i> Nutt.	Coyote willow	Saule exigu	
<i>Salix hookeriana</i> Barratt	Hooker willow	Saule de Hooker	
<i>Salix interior</i> Rowlee	Sandbar willow	Saule de l'intérieur	
<i>Salix lasiandra</i> Benth.	Pacific willow	Saule du Pacifique	
<i>Salix lucida</i> Muhl.	Shining willow	Saule brillant	
<i>Salix lutea</i> Nutt.	Yellow willow	Saule jaune	
<i>Salix mackenziana</i> (Hook.) Barratt	Mackenzie willow	Saule du Mackenzie	
<i>Salix melanopsis</i> Nutt.	Dusky willow	Saule noirâtre	106
<i>Salix nigra</i> Marsh.	Black willow	Saule noir	
<i>Salix pseudomonticola</i> Ball	Serviceberry willow	Saule amélanchier	
<i>Salix pyrifolia</i> Anderss.	Balsam willow	Saule à feuilles de poirier	
<i>Salix scouleriana</i> Barratt	Scouler willow	Saule de Scouler	
<i>Salix sericea</i> Marsh.	Silky willow	Saule soyeux	
<i>Salix sessilifolia</i> Nutt.	Northwest willow	Saule à feuille sessile	
<i>Salix sitchensis</i> Sanson	Sitka willow	Saule de Sitka	
SAMBUCUS L.			
<i>Sambucus glauca</i> Nutt.	Blueberry elder	Sureau bleu	284
SASSAFRAS Trew			
<i>Sassafras albidum</i> (Nutt.) Nees	Sassafras	Sassafras	198
SORBUS L.			
<i>Sorbus americana</i> Marsh.	American mountain-ash	Sorbier d'Amérique	210
<i>Sorbus decora</i> (Sarg.) Schneid.	Showy mountain-ash	Sorbier des montagnes	208
TILIA L.			
<i>Tilia americana</i> L.	Basswood	Tilleul d'Amérique	264
ULMUS L.			
<i>Ulmus americana</i> L.	White elm	Orme d'Amérique	182
<i>Ulmus rubra</i> Muhl.	Slippery elm	Orme rouge	184
<i>Ulmus thomasi</i> Sarg.	Rock elm	Orme de Thomas	186



2. VIIA
MATURE PONDEROSA PINE GROWING IN AN OPEN STAND OF
PONDEROSA PINE AND WESTERN LARCH, BRITISH COLUMBIA

PART I

CONIFEROUS TREES

This part deals with the coniferous (or cone-bearing) species, commonly referred to as the softwoods. These trees are evergreen, with the exception of the larches which shed their leaves in the autumn.

WESTERN YEW

Taxus brevifolia Nutt.

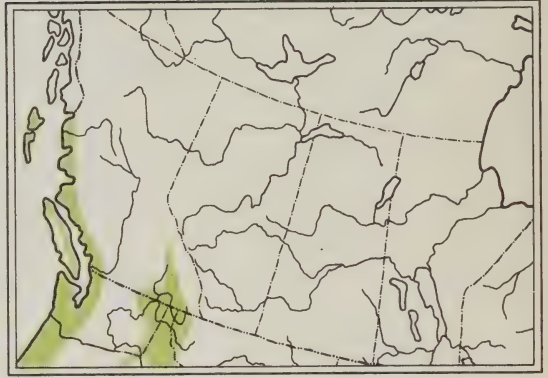
Yew, Pacific yew.

The Western yew occurs comparatively rarely as a tree, more commonly as a shrub. The tree is small, ordinarily 15 to 25 feet high and 4 to 6 inches in diameter. The trunk is much tapered, often twisted and fluted. The crown is conical and composed of slender horizontally spreading branches which bear many flat, often drooping, branchlets. In the open, the branches may extend down the trunk nearly to the ground

In Canada, the western yew is found on the islands and mainland of the Pacific Coast and in the southern parts of the Selkirk and Rocky Mountain Ranges. It is nowhere found in large stands, but usually occurs in small groups or singly. The best growth is made on deep soils beside streams and on moist flats at low elevations near the coast. In the interior at high altitudes, up to 4,000 feet, the trees are stunted, frequently sprawling over the ground.

. . .

About 8 species of yew, *Taxus* L. are known, most of them shrubs or small trees. Two species, the western yew, and the Canada yew or ground hemlock, *Taxus canadensis* Marsh., occur in Canada. Canada yew is a low shrub common in rich woodlands from Newfoundland to Manitoba.



LEAVES—Narrowly lance-shaped, flattened, sharp-pointed, $\frac{1}{2}$ to 1 inch long, borne on thread-like stems, yellow-green above, pale green below, spirally arranged on the twigs, but almost always appearing two-ranked.

FLOWERS—Spring; unisexual; male and female usually on different trees, rarely on different branches of the same tree; the male yellowish, bud-like, the female greenish, composed of several scales.

FRUIT—September; a single, hard, bony seed, about $\frac{1}{3}$ of an inch long; enclosed, but not completely covered, by a fleshy, cup-shaped envelope, greenish at first, bright coral red at maturity; shed in October.

TWIGGS—Slender, green, becoming red-brown. Buds minute, yellowish with overlapping scales.

BARK—Very thin, rough, usually scaly, dark reddish-purple.

WOOD—Heavy, hard, strong, durable, non-porous, bright orange to pale red with yellow sapwood.

Western yew is of minor commercial importance in Canada. The wood, when available in suitable size and quality, is unexcelled for uses where resilience is important, such as for bows, and canoe paddles.



MATURE FRUIT



LEAVES AND TWIGS

The PINES *Pinus* L.

The pines comprise a distinctive genus of between 80 and 90 species of trees (rarely shrubs) widely distributed throughout the forests of the northern hemisphere. About 35 species are found on this continent, 9 of which and 1 variety occur in Canada. All are trees, although a number become shrub-like at very high altitudes or on the sea-coast.

All pines are evergreen and bear long needle-like leaves, which on the Canadian species always occur in groups of 2, 3, or 5. The flowers are unisexual—either male or female—but both sexes appear in the late spring or early summer on the same tree. The male flowers are short catkin-like bodies arranged in clusters at the base of the new growth. The female flowers are cone-like in form, consisting of numerous small scales spirally arranged on a central axis. They appear singly, in pairs, or clustered on the growth of the current season and require 2 years to reach maturity.

The native pines are sometimes divided into 2 groups—the soft or white pines and the hard or yellow pines. The soft pines have their leaves in bundles of 5, the cone scales are thin or slightly thickened, and the wood is generally soft and easy to work. The hard pines have their leaves in bundles of 2 or 3, the cone scales are much thickened, and the wood is relatively hard.

SOFT PINES

Eastern white pine
Western white pine
Whitebark pine
Limber pine

HARD PINES

Red pine
Jack pine
Pitch pine
Ponderosa pine
Shore pine
Lodgepole pine

One or more species is found in every province of Canada. The white, red, and pitch pines are eastern trees, the first 2 extending as far west as southeastern Manitoba, the third confined to the Thousand Islands and adjacent district in Ontario and in southwestern Quebec. Jack pine, also an eastern tree, ranges as far west as the foothills of the Rockies in northern Alberta. The remaining 5 pines are western trees confined mostly to British Columbia.

A number of foreign pines have been introduced into Canada for reforestation and ornamental planting. The more important are the Scots pine, *Pinus sylvestris* L., the Austrian pine, *Pinus nigra* Arnold, and a dwarf form of the mountain pine, *Pinus mugho* Turra. All 3 are two-needled pines. The Scots pine is a hardy tree up to 130 feet in height with spreading branches and scaly, red or reddish-brown, plated bark. Its needles are stout, usually twisted, about 2 inches long, and are bluish green in colour. The Austrian pine grows almost as large but its needles are about 5 inches long and are very sharp-pointed. It has brownish bark and very dense foliage. The Mugho pine is a low, often spreading, shrub or small tree used only for ornamental planting.



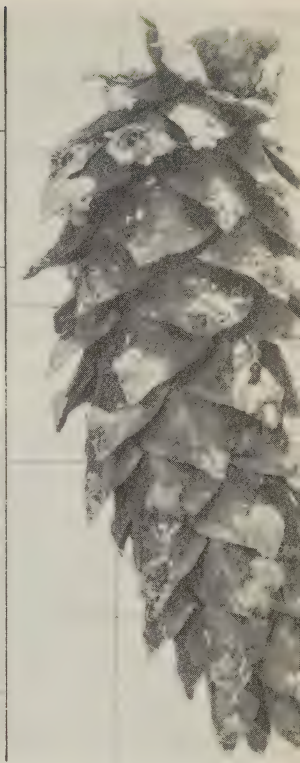
EASTERN
WHITE PINE



WESTERN
WHITE PINE



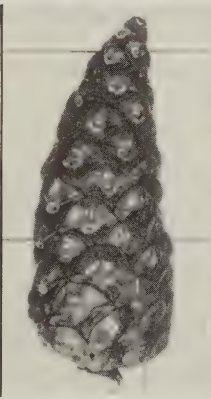
AUSTRIAN PINE



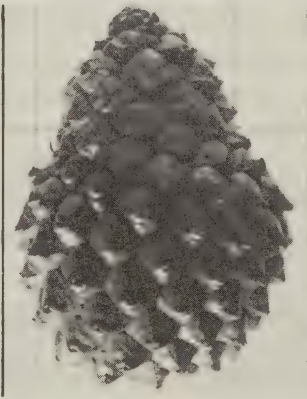
LIMBER PINE



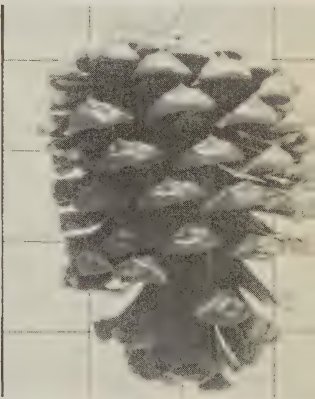
RED PINE



JACK PINE



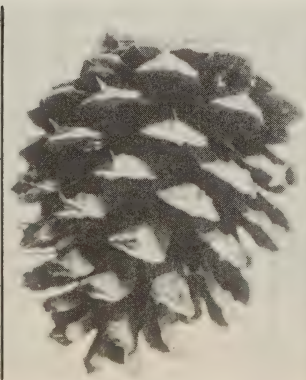
LODGEPOLE PINE



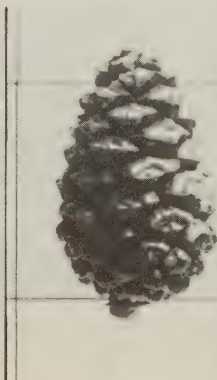
PONDEROSA PINE



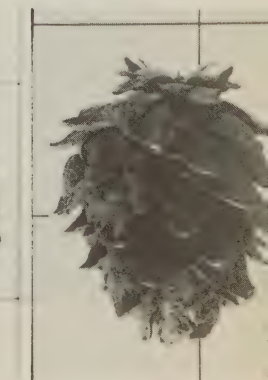
PITCH PINE



SHORE PINE



MOUNTAIN PINE



WHITEBARK PINE

THE PINES

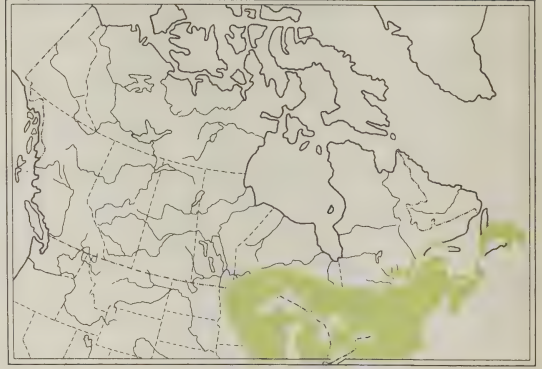
EASTERN WHITE PINE

Pinus strobus L.

White pine, cork pine, Weymouth pine, pattern pine, sapling pine, pumpkin pine, yellow pine, Quebec pine.

The eastern white pine is the tallest and most stately of all conifers in Eastern Canada. Under favourable conditions, it sometimes reaches a height of 175 feet and a diameter of 5 feet, but in the average stand is rarely found over 100 feet in height or more than 2 to 3 feet in diameter. The middle and upper branches usually grow out at right-angles to the trunk, and then curve up at the ends. This habit is not so apparent on old trees or those growing in crowded stands. The crown is more or less cone-shaped in young trees, becoming flat-topped when old. Usually, this tree puts out a moderately deep, wide-spreading, root system which makes it quite windfirm.

The eastern white pine ranges from the Atlantic Coast to south-eastern Manitoba. It will grow on a wide range of sites from dry sandy ridges to wet sphagnum bogs, but does best on a moist, sandy soil. It grows in pure stands, mixed with the red and the jack pines on sandy soils, or with the white and the red spruces, balsam fir, white birch, and the aspens on moist sites; but reaches its greatest size on rich loams with eastern hemlock, yellow birch, and sugar maple.



LEAVES—Needle-like, in bundles of 5, slender, soft, triangular in cross-section, $2\frac{1}{2}$ to $5\frac{1}{2}$ inches long, bluish-green.

FLOWERS—May-June; unisexual; male yellow, female pink or pink and purple, both on the same tree.

FRUIT—September of the second year; a cylindrical, stalked cone, 3 to 8 inches long, often slightly curved, brown with thin scales; opening at maturity, falling soon afterwards.

TWIGS—Slender, at first green and downy, later smooth, orange-brown, roughened by the leaf scars. Buds sharp-pointed, with long-pointed, reddish-brown scales.

BARK—On young stems, smooth, dark green, often tinged with brown; on old trunks rough, dark grey, deeply furrowed into broad, scaly ridges.

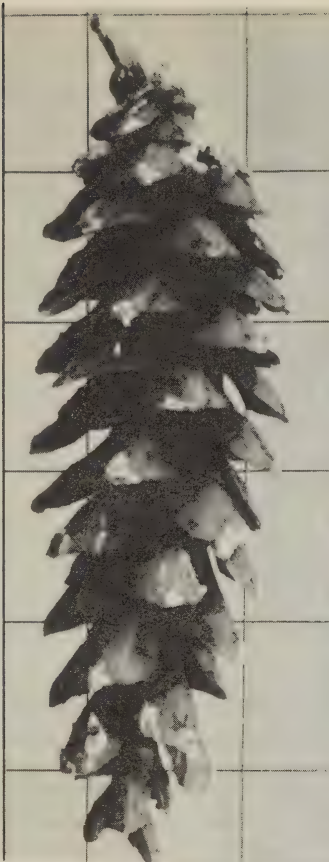
WOOD—Light, soft, not strong, non-porous; creamy-white to straw-brown, sapwood almost white.

This species produces the most valuable soft-wood lumber in Canada. The outstanding use is for pattern stock or similar uses where a soft, easily worked, even-textured material is required.

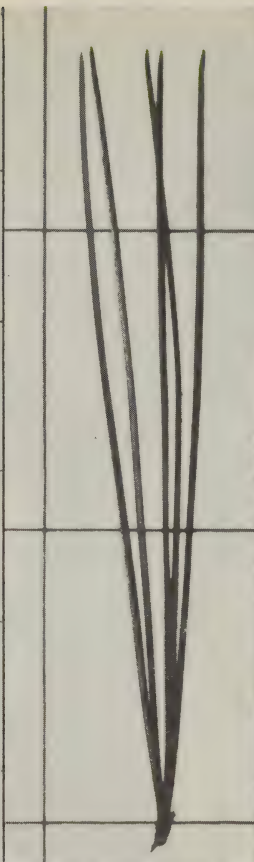
EASTERN WHITE PINE



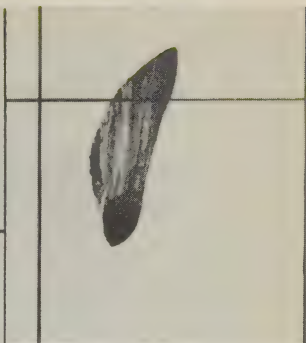
MATURE
CLOSED CONE



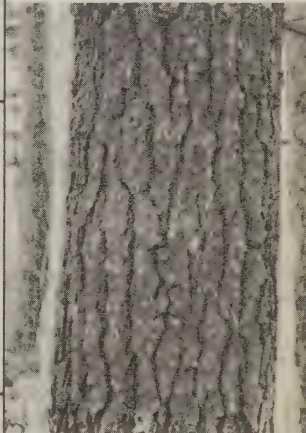
OPENED
CONE



FIVE NEEDLES



SEED



BARK



OPEN-GROWN TREE



FOREST TREES AT LAC BERNIER, QUE.

THE PINES

WESTERN WHITE PINE

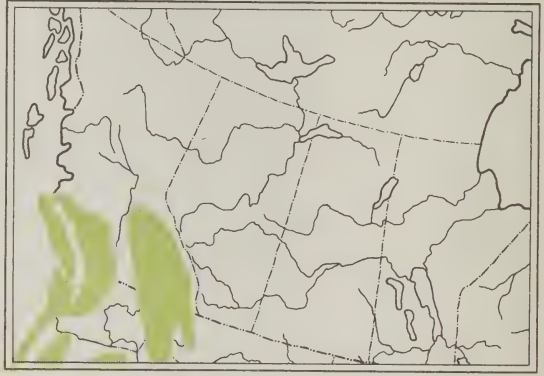
Pinus monticola Dougl.

White pine, silver pine, mountain Weymouth pine, Idaho white pine.

The western white pine occasionally reaches a height of 250 feet and a diameter of 8 feet, but is more often 90 to 110 feet high and 2 to 3 feet in diameter. In dense stands it produces a tall slender trunk and a narrow, conical crown of short, mostly drooping, branches. In the open, one or more long, stout branches may extend out 10 to 15 feet beyond the others. Young trees usually start out with a deep tap root; later this is reinforced with a system of widely spread laterals.

This pine is found throughout southern British Columbia. On the coast it occurs on Vancouver Island and the adjacent mainland. In the interior, it ranges north to Quesnel Lake. It is seldom found at altitudes exceeding 2,500 feet on the coast or 3,500 feet in the interior. The best growth is made on a deep, moist, well-drained soil, but it is also common on poor sandy sites. It rarely forms pure stands in Canada.

The only other 5-needled trees within the range of this species are the limber and whitebark pines. The leaves of these two species are more clustered at the ends of the twigs than those of the western white pine.



LEAVES—Needle-like, in bundles of 5, stiff, $1\frac{1}{2}$ to 5 inches long, bluish-green with a whitish tinge.

FLOWERS—Early spring; unisexual; male yellow, female pale purple, both on the same tree.

FRUIT—September of the second year; a slender, long-stalked, yellow-brown cone, 4 to 10 inches long with thin scales; opening at maturity, falling soon afterwards.

TWIGS—Slender, at first covered with dark red down; later smooth, brownish. Buds about $\frac{1}{2}$ -inch long, cylindrical, blunt.

BARK—On young stems, silvery-grey, thin, smooth; on old trunks, greyish purple to cinnamon-brown, broken into small thick rectangular plates; inner bark cinnamon-red.

WOOD—Light, soft, fine-grained, non-porous; pale brown with nearly white sapwood.

The wood is similar to that of the eastern white pine. Its lumber is also used for pattern stock and similar uses where its soft even-textured characteristics are important.

WESTERN WHITE PINE

FIVE NEEDLES



CLUSTER OF
OPENED CONES



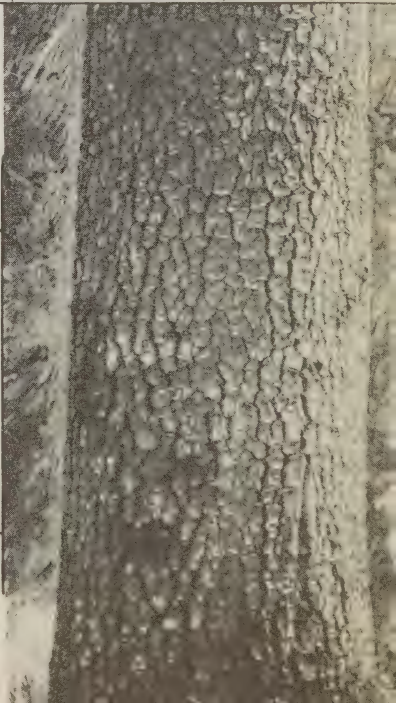
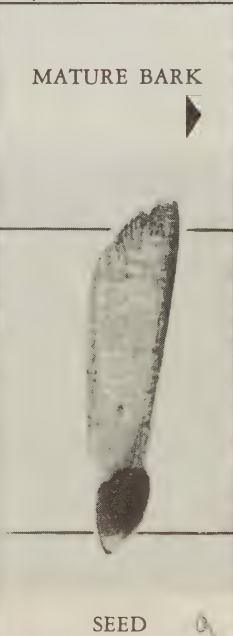
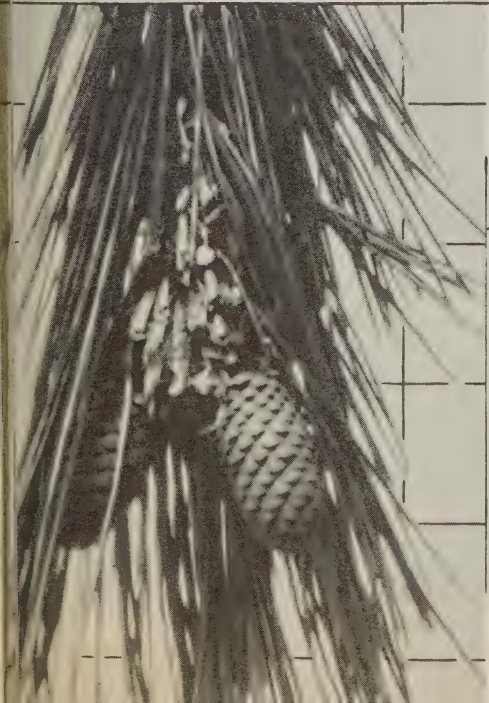
ONE-YEAR-OLD
CONES



MATURE BARK



SEED



THE PINES

WHITEBARK PINE

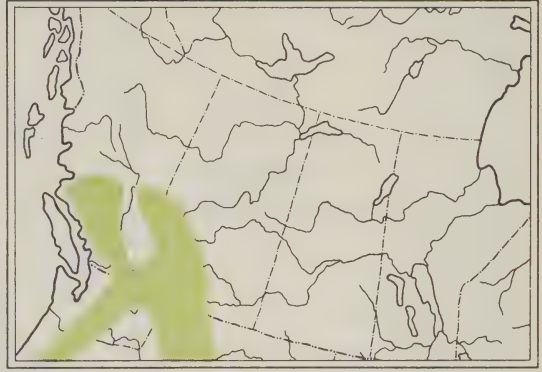
Pinus albicaulis Engelm.

White-stemmed pine, scrub pine.

The whitebark pine is a small- to medium-sized tree rarely more than 30 to 40 feet in height and 1 to 2 feet in diameter, even when growing in sheltered situations. Usually it is much smaller, and on exposed, windswept slopes at high altitudes is often reduced to a low shrub with long, prostrate branches spreading over the ground. The trunk is usually short, much tapered, and twisted; the crown of long, flexible, wide-spreading branches is open and irregular.

The whitebark pine grows sparingly in Alberta and British Columbia at altitudes from 3,000 to 7,000 feet. In the Rockies it extends as far north as the headwaters of the Parsnip River, and in the coast mountains to the vicinity of Gardner Canal; it is not known on Vancouver Island. It grows in pure stands and as a scattered tree in association with limber pine, lodgepole pine, mountain hemlock, Douglas fir, and Engelmann spruce, chiefly on exposed slopes and rocky ridges.

The short, stout cones with thick, purplish scales are the best means of identifying this tree.



LEAVES—Needle-like, in bundles of 5, stout, rigid, slightly curved, $1\frac{1}{2}$ to 3 inches long, dark yellow-green.

FLOWERS—July; unisexual; small, scarlet bodies, the male and female on the same tree.

FRUIT—August-September of the second year; an ovoid, purplish cone, $1\frac{1}{2}$ to 3 inches long, not stalked, with thickened, often sharp-pointed, scales; falling closed at maturity, the seed being released as the cone decays.

TWIGS—Stout, tough, usually hairy, reddish-brown to chalky-white, with sharp-pointed, loosely scaled buds.

BARK—On young stems, thin, smooth, chalky-white; on old trunks rarely more than $\frac{1}{2}$ -inch thick, broken into narrow, brownish-white, plate-like scales.

WOOD—Light, soft, brittle (when dry), non-porous; pale brown with thin whitish sapwood.

This tree is the least important of the western pines. It is used locally for fuelwood and, when other wood is scarce, for saw and mine timbers.

WHITEBARK PINE

MATURE CONES
ATTACHED TO
BRANCH ▶



MATURE TREE GROWING NEAR THE TIMBERLINE ON THE
EAST SLOPE OF THE ROCKY MOUNTAINS IN ALBERTA

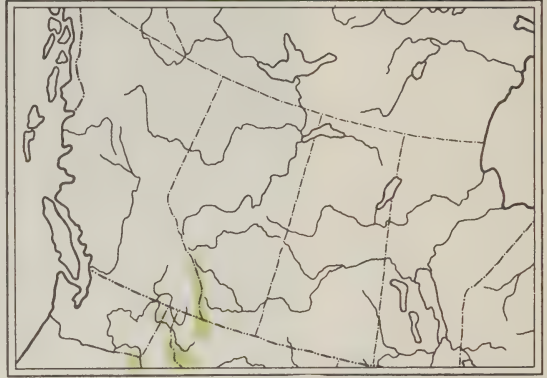
LIMBER PINE

Pinus flexilis James

Rocky Mountain pine, Rocky Mountain white pine.

The limber pine, like the white-bark pine which it closely resembles, is a small alpine tree 25 to 40 feet in height and 1 to 2 feet in diameter. The trunk is short, thick, limby, and crooked, and the crown is irregular on account of the irregular whorls of thick limbs. On exposed slopes at high altitudes much of the limber pine growth is prostrate and shrubby. In old trees the lower branches are very long and tend to droop. The young branches are very tough and flexible, hence the name limber pine.

This tree is found in Canada in the mountains of southern British Columbia and Alberta, at an altitude of 5,000 to 6,000 feet. It is adapted to a great variety of soils, but is most often found on dry, rocky, and exposed slopes. It occurs in small pure stands or singly in mixture with mountain hemlock, whitebark pine, lodgepole pine, Douglas fir, and Engelmann spruce. In southern Alberta it is also found on the tops of the foothills.



LEAVES—Needle-like, in bundles of 5, stout, stiff, slightly curved, $1\frac{1}{2}$ to $3\frac{1}{2}$ inches long, dark green, mostly clustered on the ends of the twigs.

FLOWERS—Late June; unisexual; small reddish bodies, usually in clusters, male and female on the same tree.

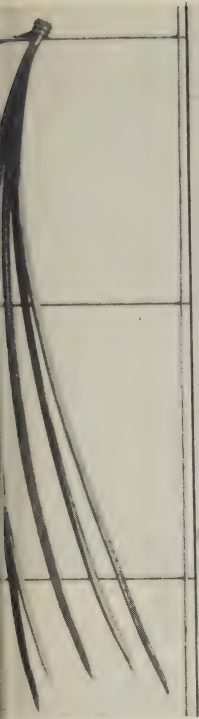
FRUIT—September of the second year; a cylindrical cone, 3 to 8 inches long, short-stalked, with long, narrow, pointed, yellowish-brown scales, rounded, somewhat thickened at the tips; opening at maturity and falling during the winter. Seeds nearly wingless.

TWIGS—Stout, tough; at first hairy, orange-green; later, smooth, darker; buds ovoid, pointed.

BARK—On young stems, smooth grey or silvery-white; becoming rough, dark brown to almost black, deeply fissured into wide, scaly plates.

WOOD—Light, moderately soft, close-grained, non-porous; lemon-yellow with nearly white sapwood.

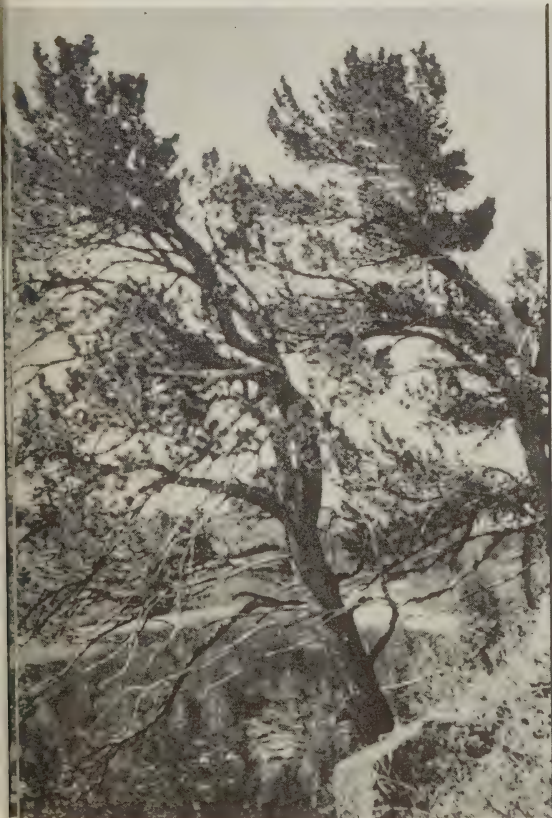
The limber pine, although occasionally used locally for fuelwood, has no commercial importance.



THE NEEDLES



PARTIALLY OPENED CONES



HOOKED TREES, HIGHWOOD RIVER, ALTA.



ONE-YEAR-OLD CONES

RED PINE

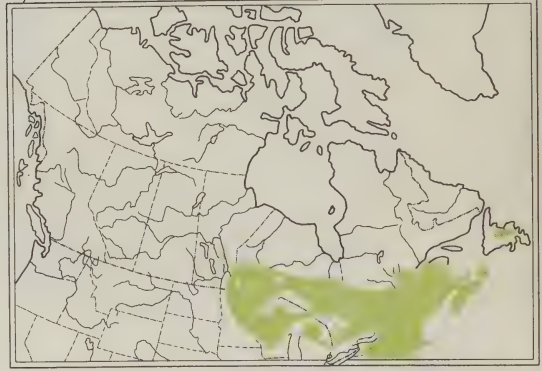
Pinus resinosa Ait.

Norway pine, yellow pine, Canadian red pine.

The red pine is a medium-sized to large tree 75 to 125 feet in height and 1 to 3 feet in diameter. The trunk is erect, well-formed, has little taper, and when growing in a dense stand is clear of branches for over three-quarters of its length. The symmetrical, oval crown of whorled, horizontal or somewhat drooping branches, and the tufted green foliage give the tree a distinctive appearance. The root system is moderately deep and wide-spreading. On some sites, the tree puts out a tap root which is reinforced later with several strong lateral roots. On other sites it may produce only lateral roots.

The red pine is found from the Atlantic Coast to southeastern Manitoba. It grows best on a deep, loamy sand or gravel, but will thrive on a variety of sites. It occurs in pure stands, in mixtures with white and jack pine, or as scattered trees with spruce and various hardwoods.

Its distinctive appearance, long, needle-like leaves borne 2 in a bundle, and light reddish, plated bark are all reliable means of identifying this tree. The leaves are distinguished from those of the jack pine, the only other pine in Eastern Canada with 2 leaves in a bundle, by their greater length and the fact that they are not twisted.



LEAVES—Needle-like, in bundles of 2, flat on one side and rounded on the other, flexible, $4\frac{1}{2}$ to $6\frac{1}{2}$ inches long, shiny, dark green.

FLOWERS—May-June; unisexual; male dark purple, female scarlet, both sexes on the same tree.

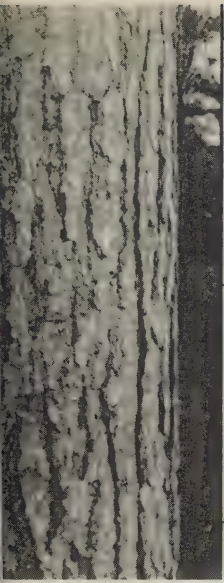
FRUIT—Autumn of the second year; an ovoid cone, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, the scales thickened at the tips and without prickles; opening at maturity; persisting on the tree until the following spring.

TWIGS—Stout, rough, orange to reddish-brown. Buds $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long, sharp-pointed, resinous, with loosely overlapping, chestnut-brown, somewhat hairy scales.

BARK—On young stems, reddish, scaly; on old trunks reddish-brown, divided by shallow furrows into broad, flat, scaly plates.

WOOD—Light, relatively hard, straight-grained, non-porous; slightly reddish with yellowish sapwood.

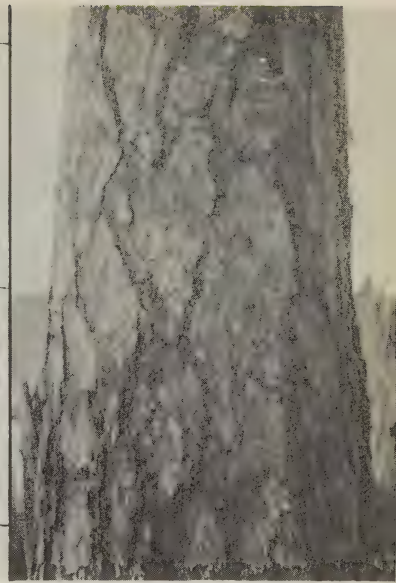
The wood is generally darker than that of the white pine. Being heavier and stronger than white pine it is more valuable for structural timbers. It has a thick sapwood readily penetrated by creosote and, for this reason, is used extensively for poles and piling. The tree is popular for ornamental planting and generally does well in plantations.



BARK

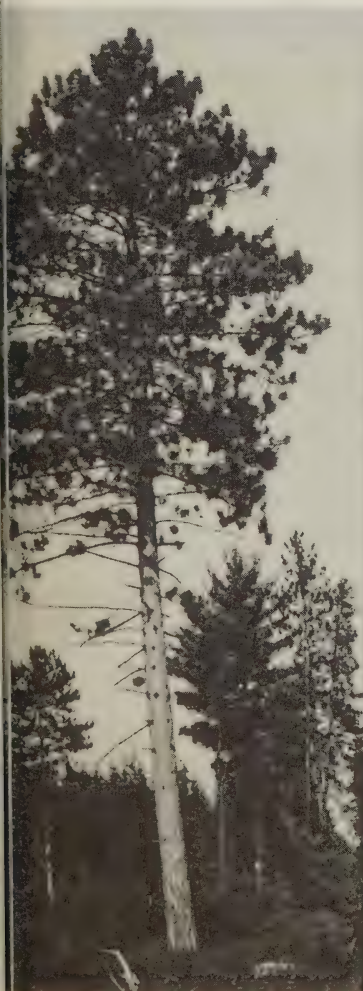


OPENED CONE

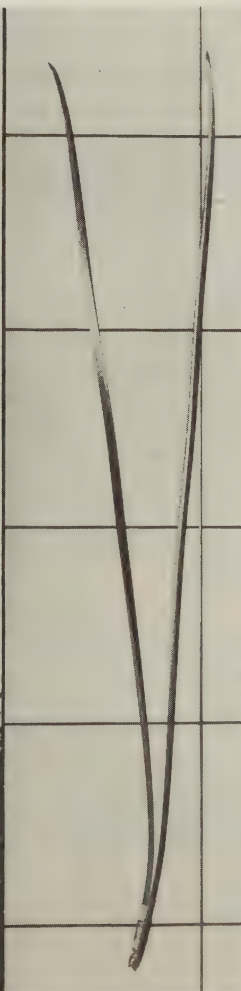


MATURE BARK

SEED



TREES AT PETAWAWA, ONT.



TWO NEEDLES



CLUSTER OF CLOSED CONES ON BRANCH

JACK PINE

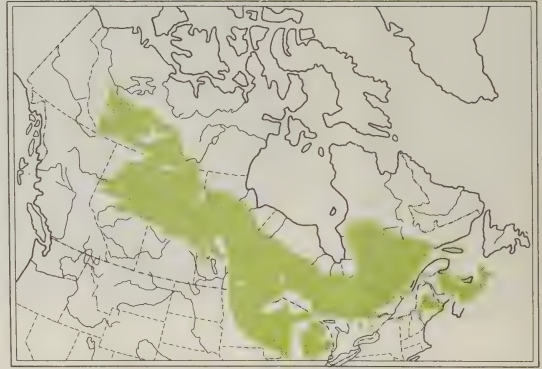
Pinus banksiana Lamb.

Banksian pine, princess pine, grey pine, scrub pine, cypress, juniper.

In the open or on unfavourable situations the jack pine is stunted and scrubby, but when growing in closed stands on good sites it develops a straight trunk which may reach a height of 80 feet and a diameter of 2 feet. Ordinarily, however, it is 40 to 50 feet in height and 8 to 12 inches in diameter with a narrow, open crown of many short, twisted branches. The root system is moderately deep.

This pine ranges in Canada from Nova Scotia and central Quebec to northern British Columbia and the Mackenzie River Valley. It grows in pure stands on poor soils, and in pure stands or mixed with black spruce, the aspens, and white birch on dry, deep, sandy soils. It is rarely found on very moist or wet sites. In northwestern Alberta its range overlaps that of the closely related lodgepole pine, a tree which it resembles in many respects.

The bark of the jack pine is, as a rule, thicker, lighter in colour, and broken into larger scales than that of the lodgepole pine. The foliage is a lighter green and usually the needles are more twisted. Most important, the scales of mature jack pine cones are usually unarmed.



LEAVES—Needle-like, in bundles of 2, usually much twisted and spreading apart, stiff, $\frac{3}{4}$ to 2 inches long, light yellowish-green.

FLOWERS—May-June; unisexual; the male yellow, the female dark purple, both sexes on the same tree.

FRUIT—September of the second year; a yellowish-brown cone, 1 to 2 inches long, often borne in pairs, usually curved and pointing toward the tips of the branches, the scales thickened, usually unarmed; often remaining closed on the tree for many years.

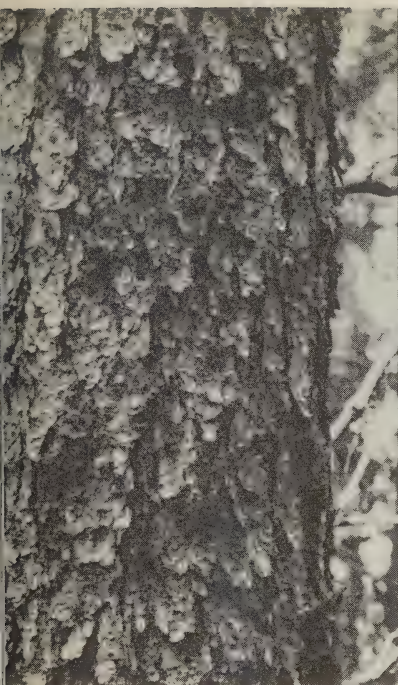
TWIGS—Slender, tough, smooth, yellowish-green; buds pale reddish-brown, rounded, about $\frac{1}{4}$ of an inch long.

BARK—Thin, reddish-brown to dark grey on young stems; becoming scaly, irregularly furrowed on old trunks.

WOOD—Medium hard and heavy, not strong, variable texture, non-porous; brownish-yellow with creamy-white sapwood.

This species has become very important as a lumber producer. It takes creosote well and is used extensively for railway ties, poles, and in the manufacture of kraft pulp.

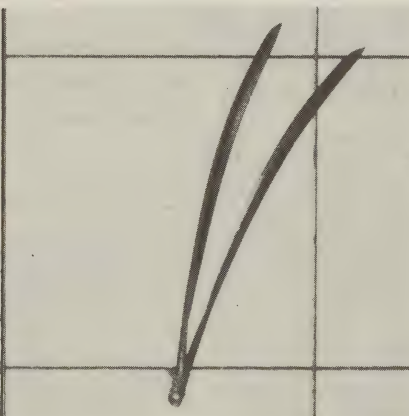
JACK PINE



MATURE BARK



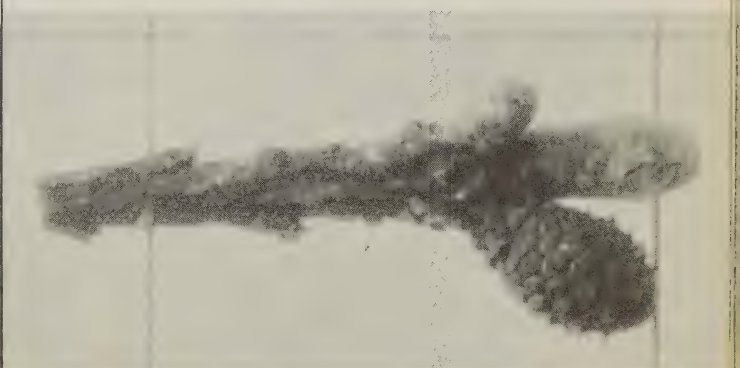
CLOSED CONES



NEEDLES



CLOSED CONE



ONE-YEAR-OLD CONES

PITCH PINE

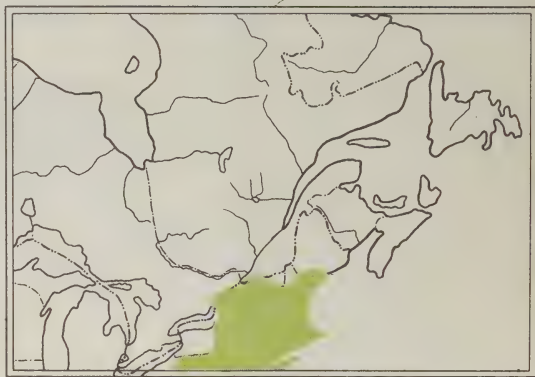
Pinus rigida Mill.

Scrub pine, jack pine, rigid pine.

Under the most favourable conditions the pitch pine will reach a height of 60 feet and a diameter of 2 feet. Usually, however, it is a small tree about 30 feet high and 6 to 8 inches in diameter. The crown is fairly symmetrical in youth, but with age it becomes broad and open, and the many crooked and persistent dead branches give the whole tree a very ragged appearance. The twigs, which are stout, are frequently found sprouting in clusters directly from the bark on the trunk. This tree is the only native conifer that possesses the power of reproducing by means of sprouts from the stump. It usually produces a short tap root.

Pitch pine has a very limited range in Canada, being found only on the Thousand Islands in the St. Lawrence River and on the adjacent mainland in Ontario, and in Chateauguay County in southwestern Quebec. It has also been reported from southwestern New Brunswick. It will grow on a variety of soils, but is most frequently found on dry gravelly slopes, and rocky ridges and cliffs.

It is the only pine in Eastern Canada with 3 leaves in a bundle.



LEAVES—Needle-like, in bundles of 3, stiff, blunt, 3 to 5 inches long, dark yellow-green; often found growing in tufts along the trunk.

FLOWERS—April-May; unisexual; male yellow or rarely purple, female light green tinged with purple, both on the same tree.

FRUIT—Autumn of the second-year; a stout, dark green cone, 2 to 3½ inches long, the scales thickened at the tip and armed with a short, stiff prickle; opening in the autumn and winter at irregular intervals; often remaining on the tree for many years.

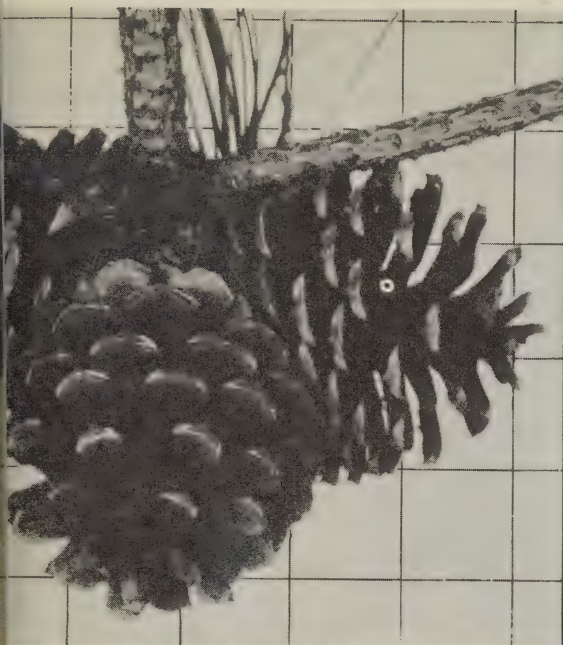
TWIGS—Stout, orange to dark grey-brown. Buds, sharp-pointed, often resinous, chestnut-brown.

BARK—Reddish-brown; smooth, becoming very scaly, finally thick and furrowed into large irregular plates.

WOOD—Light, soft, resinous, coarse-grained, non-porous; light brown with yellow sapwood.

As this pine is usually scrubby in Canada it is rarely suitable for any use but fuelwood.

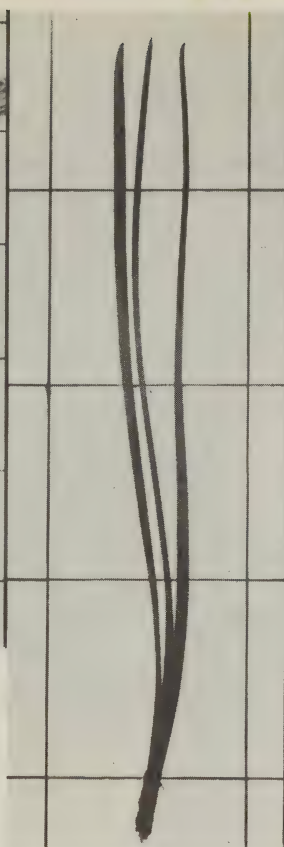
PITCH PINE



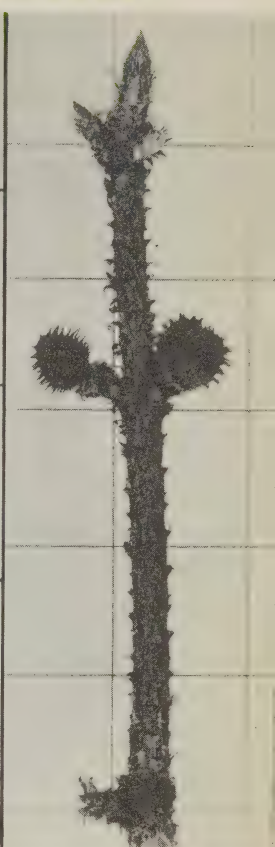
OPENED CONE



SEED



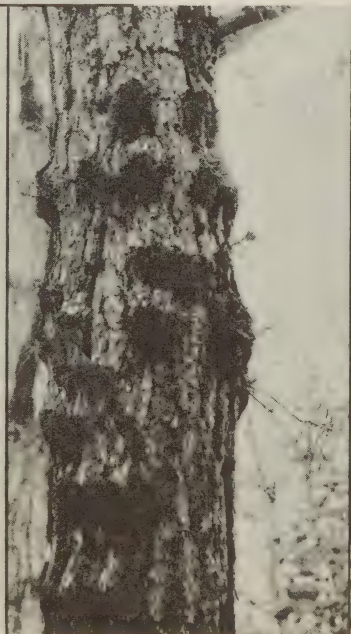
THREE NEEDLES



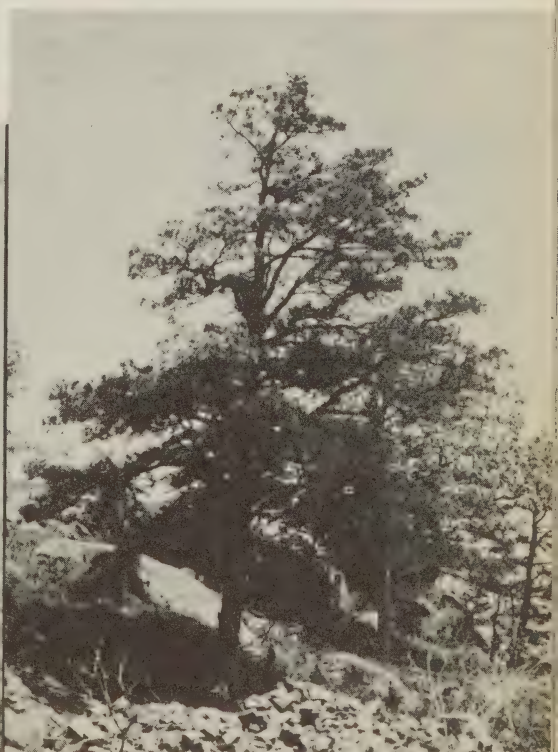
TWIG, BUDS, AND
ONE-YEAR-OLD CONES



CLOSED CONES



MATURE BARK SHOWING
CLUSTERS OF NEEDLES



TREE, LEEK ISLAND,
THOUSAND ISLANDS, ONTARIO

PONDEROSA PINE

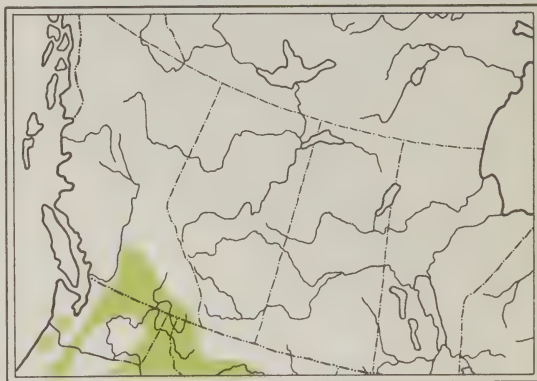
Pinus ponderosa Laws.

Western yellow pine, bull pine, yellow pine, British Columbia pine, jack pine.

Under particularly favourable conditions the ponderosa pine reaches heights of 160 to 170 feet, or more, and diameters of 5 to 6 feet. Ordinarily it attains a height of 75 to 80 feet, and a diameter of 2 to 2½ feet. The trunk is straight, usually clear of branches for much of its length, and has very little taper. The branches are short, stiff, much branched, and turned up at the ends. Young twigs when broken have a smell similar to that of an orange peel. The crown is narrow and spire-like. The root system is moderately deep and wide-spreading.

This tree is confined in Canada to the drier portions of the southern interior of British Columbia, extending as far north as Vavenby on the North Thompson River. It grows on dry, well-drained slopes or plateaux, usually at between 1,500 and 2,500 feet elevation, but on exposed southerly slopes may extend up to 3,500 feet.

Ponderosa pine is peculiar in having its leaves in bundles of 2 to 5 leaves, 3 being the more usual. It is the only pine with 3 leaves in a bundle native to Western Canada.



LEAVES—Needle-like, in bundles of 2 to 5, commonly in 3s, rarely in 4s or 5s, stout, clustered toward the ends of the twigs, 5 to 11 inches long, dark yellow-green.

FLOWERS—May-June; unisexual; male yellow, female dark red, both on the same tree.

FRUIT—Autumn of the second year; a short-stalked, reddish-brown cone, 2½ to 6 inches long, with thickened scales usually tipped by sharp prickles; opening at maturity, and upon falling usually leaving a few basal scales still attached to the branch.

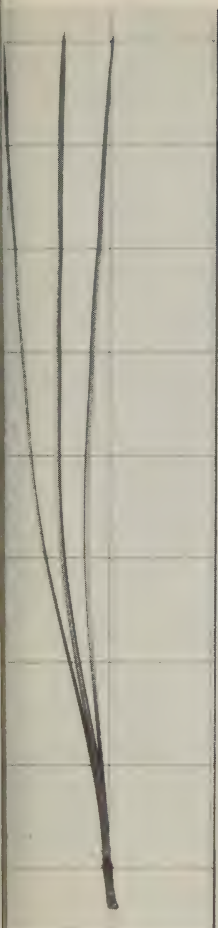
TWIGS—Stout, orange-coloured. Buds about ½-inch long, often coated with resin.

BARK—On young stems, brown to almost black, fissured into firm scaly ridges; on old trunks, 3 to 4 inches thick, reddish-brown, deeply furrowed into long, flat, scaly plates.

WOOD—Light, soft, fine- to coarse-grained, non-porous; light brown with nearly white sapwood.

This tree is a valuable source of lumber for boxes and other requirements of the fruit industry of British Columbia. The sapwood yields a fine quality lumber, similar to that of white pine, and is suitable for pattern-making, and other exacting uses.

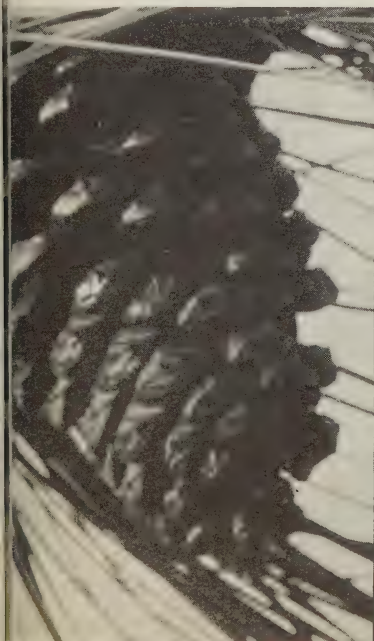
PONDEROSA PINE



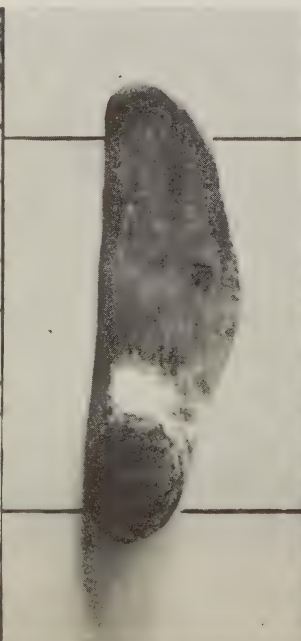
THREE NEEDLES



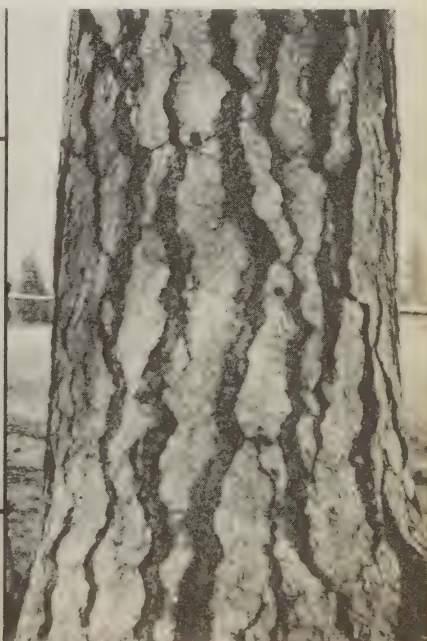
NEEDLES, OPENED CONE, ONE-YEAR-OLD CONES,
AND BASAL SCALES LEFT BY FALLEN CONE



PARTIALLY OPENED CONE



SEED



MATURE BARK

SHORE PINE

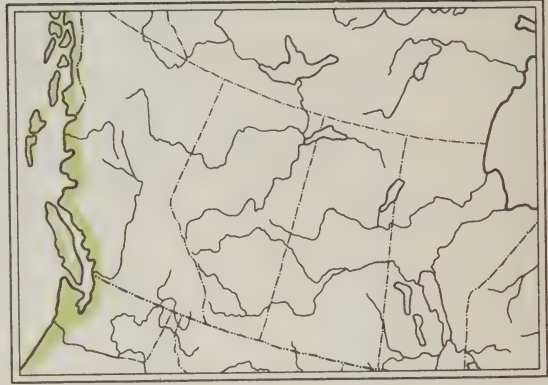
Pinus contorta Dougl.

Scrub pine, screw pine.

Considerable disagreement exists as to the proper classification of the shore and the lodgepole pines. In the past many botanists considered them sufficiently distinct to justify their classification as separate species, while others maintained that there was only one, variable, species, the shore pine being the coast form and the lodgepole pine the inland or mountain form. In this text the shore pine is treated as the species and the lodgepole pine as a variety of it.

The shore pine is a small, usually shrubby tree 15 to 50 feet in height and 12 to 18 inches in diameter. It normally develops a crooked, often twisted trunk and an irregular, open crown of large, twisted, generally much-forked branches. In Canada this pine is mostly confined to swampy ground and sand dune areas at low elevations along the Pacific Coast of British Columbia. On the higher slopes of the coast mountains, it gradually merges with the lodgepole pine.

The shore and the lodgepole pines are differentiated chiefly by the thicker, reddish-brown bark, shorter leaves, and smaller cones of the shore pine. Its wood is generally more resinous, somewhat harder, and not as straight-grained as that of the lodgepole pine.



LEAVES—Needle-like, in bundles of 2, stiff, somewhat twisted, 1 to 1½ inches long, dark green.

FLOWERS—About May; unisexual; orange-red, both sexes on the same tree.

FRUIT—Autumn of the second year; an egg-shaped, light yellow-brown cone, ¾ to 2 inches long; the scales thickened, usually tipped with slender, fragile prickles, often remaining closed on the tree for many years.

TWIGS—Stout, orange-coloured to reddish-brown to almost black; buds ovoid, about ¼ of an inch long, resinous, reddish-brown.

BARK—From ¾ to 1 inch thick, deeply furrowed and covered with reddish-brown scales.

WOOD—Medium hard and heavy, often twisted, non-porous; light brown with nearly white sapwood.

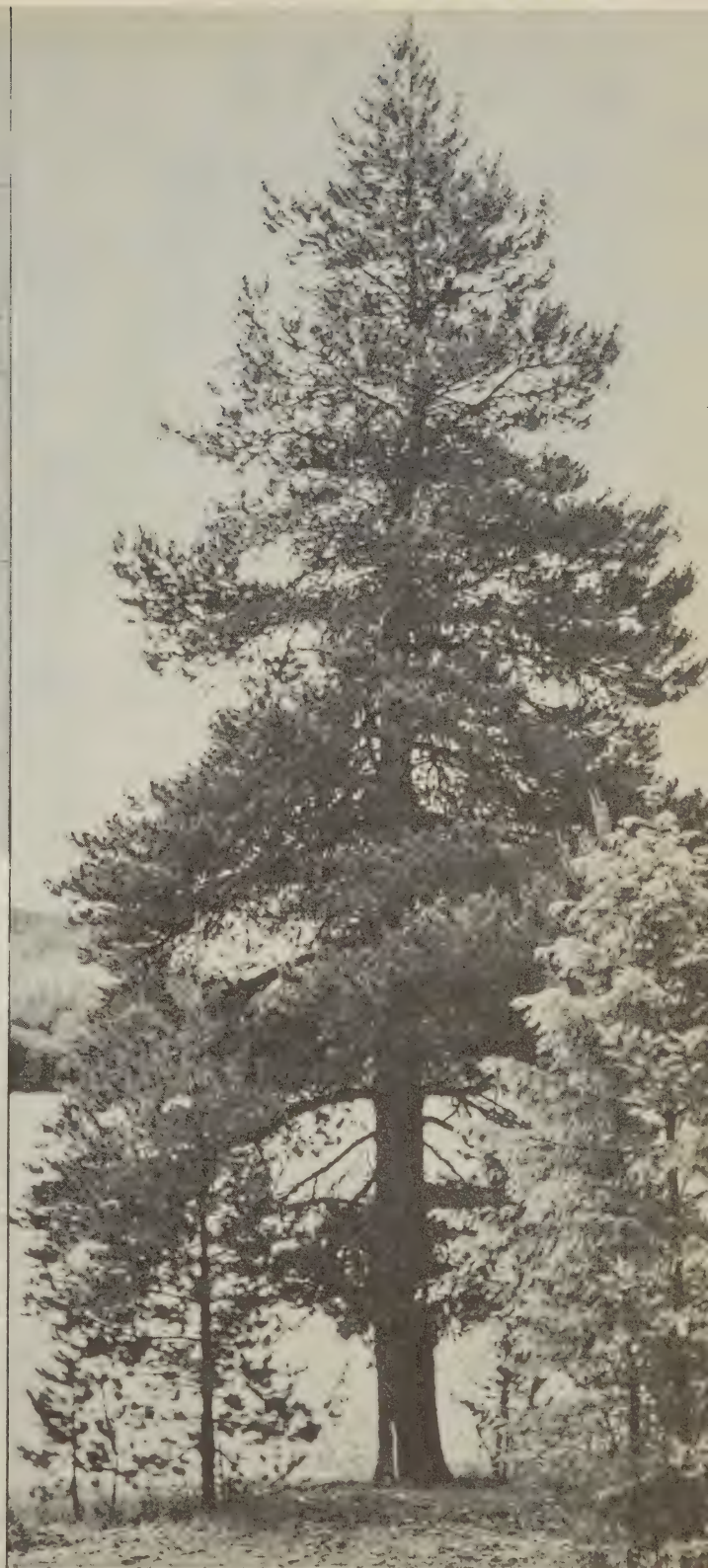
The shore pine is used for fuelwood to a limited extent, but is of negligible commercial importance.



NEEDLES AND
ONE-YEAR-OLD CONES



OPENED CONE



MATURE TREE, BRITISH COLUMBIA

LODGEPOLE PINE

Pinus contorta Dougl.
var. *latifolia* Engelm.

**Black pine, jack pine, western jack pine,
white pine, cypress.**

The lodgepole pine usually forms dense stands in which it develops a tall, slender trunk 50 to 100 feet in height and 1 to 2 feet in diameter. In the forest, the crown of small branches is narrow, round-topped, and confined to the top of the tree. In the open the branches are somewhat longer and may extend down the trunk nearly to the ground. This tree nearly always produces a tap root in its youth; later it develops a system of strong, moderately deep, wide-spreading, lateral roots.

This pine has a very wide range for a western species, since it is found over most of British Columbia, in the southern part of the Yukon, and on the eastern slope and foothills of the Rocky Mountains in Alberta. It is also found in the Cypress Hills in Alberta and Saskatchewan. Although not a timber-line species it grows usually at altitudes from 2,000 to 5,000 or 6,000 feet. It is adapted to a wide range of sites, but makes its best growth on deep, moist, well-drained loam in pure even-aged stands, and with Douglas fir and Engelmann spruce. At high altitudes it grows with alpine fir.



LEAVES—Needle-like, in bundles of 2, somewhat twisted, stiff, 1 to 3 inches long, yellow-green.

FLOWERS—About May; unisexual; orange-red, both sexes on the same tree.

FRUIT—Autumn of the second year; an egg-shaped, yellow-brown cone, 1 to 2 inches long, often borne in clusters, the scales thickened and usually armed with slender prickles; often remaining closed on the tree for many years.

TWIGS—Stout, orange-brown to black; buds ovoid, about $\frac{1}{4}$ of an inch long, red-brown, somewhat resinous.

BARK—Very thin, orange-brown to grey, slightly scaly.

WOOD—Relatively light and soft, mostly straight-grained, non-porous; light yellow to yellowish-brown with nearly white sapwood.

This is one of the most valuable timber trees in western Canada. It is used extensively for railway ties, mine timbers, and poles, and is also valuable for the manufacture of pulp.

LODGEPOLE PINE



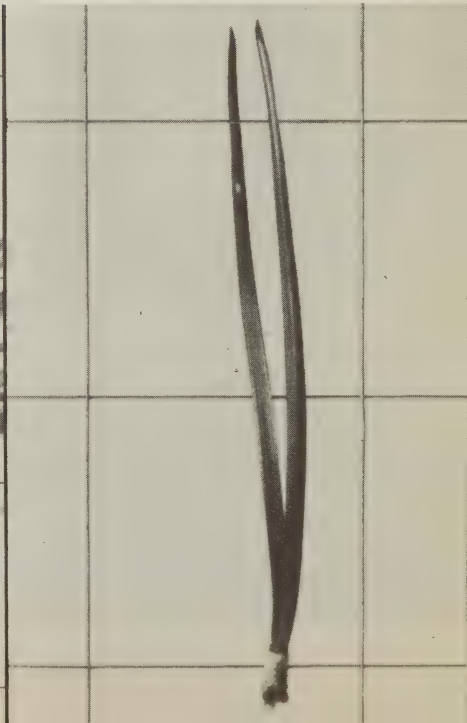
ONE-YEAR-OLD CONES ▲

◀ MATURE TREES, KANANASKIS, ALTA.

MATURE CONES



BUNDLE OF TWO NEEDLES ▼



The LARCHES *Larix* Mill.

About 10 species of larch are known, most of them confined to the northern hemisphere. Three species occur in Canada, of which 2, the alpine larch and the western larch, are confined to the West. The tamarack, the only species found in the East also extends into the West, and, along with the black and white spruces, forms our most northerly forests. The European larch, *Larix decidua* Mill., a native of Northern and Eastern Europe, and the Siberian larch, *Larix sibirica* Ledeb., from Russia and Siberia are often planted for ornamental purposes in Canada.

As a rule, the larches are tall trees with straight, gradually tapering stems and hard, heavy, non-porous wood of high technical value. They develop thin, often narrow crowns of slender, irregularly whorled, and either spreading or drooping branches. The bark is usually quite thick and scaly. They are easily distinguished from the other cone-bearing trees by their leaves, which on the older twigs are borne in brush-like clusters of 12 to 40 on short spur-like growths or knobs which stand out from the twigs. On new shoots the leaves are solitary and spirally arranged. The leaves of the larches turn yellow and drop off each autumn, so the tree is left bare during the winter months. No other native cone-bearing tree has this characteristic.

The unisexual male and female flowers appear separately on the same branch shortly after the start of the spring growing season. The male flowers are small, yellowish-green bodies about the size and shape of a medium-sized pea. The female flowers resemble small cones and are greenish, reddish, or bright purple in colour. They develop in one season into woody, short-stalked cones which open at maturity and then fall off the tree shortly afterwards. Two winged seeds are borne under each cone scale.

The European larch is a rather large tree with dark greyish-brown bark, and smooth, slender, yellowish twigs and branchlets. It can be distinguished from the 2 western larches by the cone bracts, which are shorter than the scales. The tamarack also has short bracts but its cones are only half as long as those of the European larch. The Siberian larch is also distinguished by its short bracts, but the outer surface of the cone scale is somewhat downy and the twigs are yellowish-grey.



MATURE WESTERN LARCH AND YOUNG PONDEROSA PINE, B.C.

THE LARCHES

TAMARACK

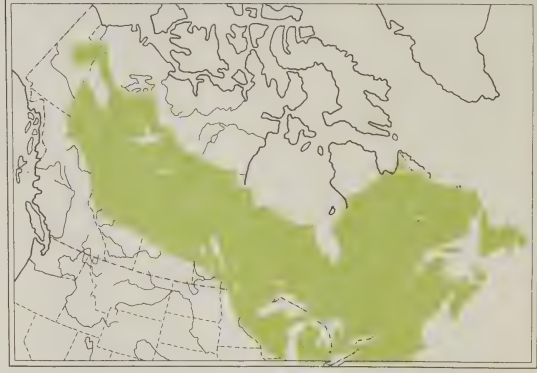
Larix laricina (Du Roi) K. Koch

Larch, American larch, hackmatack, juniper, black larch

The tamarack is a medium-sized tree 60 to 70 feet in height and 1 to 2 feet in diameter. The trunk is cylindrical and has little taper for its length. With slight crowding it clears itself quickly of branches. On young trees or those growing in dense stands the crown is narrowly pyramidal in outline, but as the tree becomes older the crown opens up and becomes irregular. The slender branches are slightly ascending. The root system is shallow and spreading, particularly in bogs.

This tree is found from the Atlantic Coast to northern British Columbia and north in the valley of the Mackenzie River to the limit of tree growth. In the southern part of its range it is confined chiefly to bogs and swamps, growing with black ash, balsam fir, and black spruce. In the north it is found on better-drained situations, such as the flats along rivers, in company with balsam fir, white and black spruce, jack pine, trembling aspen, and white birch. It rarely forms pure stands of any extent.

A variety, *alaskensis* (Wight) Raup, the Alaska larch, has been reported from northern Aiberta, Mackenzie and the Yukon. It differs chiefly in its narrower cone scales and more evenly pointed bracts.



LEAVES—Needle-like, $\frac{3}{4}$ to $1\frac{1}{4}$ inches long, light green turning yellow in the autumn, borne singly on new shoots, arranged in brush-like clusters of 12 to 20 on older twigs.

FLOWERS—May-June with the leaves; unisexual; both sexes on the same twig, male yellow, the female reddish.

FRUIT—Autumn; an erect, short-stalked, chestnut-brown cone, about $\frac{1}{2}$ -inch long, composed of about 20 thin scales with concealed bracts; opening during the autumn and winter; falling the second season.

TWIGS—Slender, pliable, orange-brown, developing numerous spur shoots after the first season; the buds small, rounded, dull dark red, smooth, shiny.

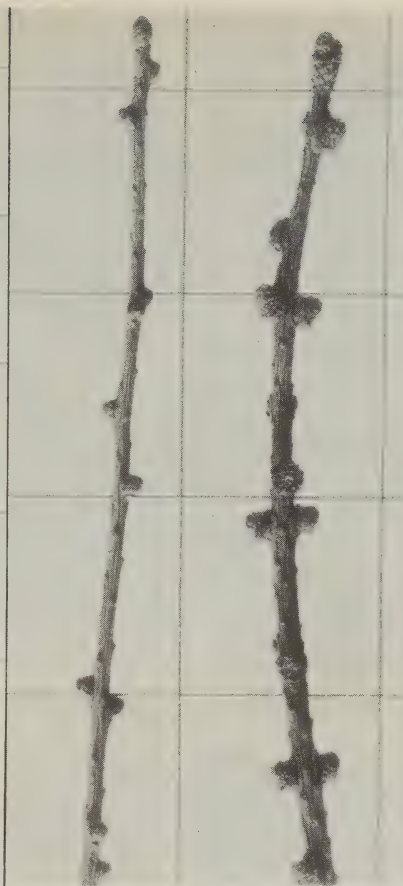
BARK—Thin, at first smooth, bluish-grey; later roughened by small, flaky, reddish-brown scales.

WOOD—Moderately heavy and hard, more or less oily, frequently spiral-grained, non-porous; yellowish-brown with thin, white sapwood.

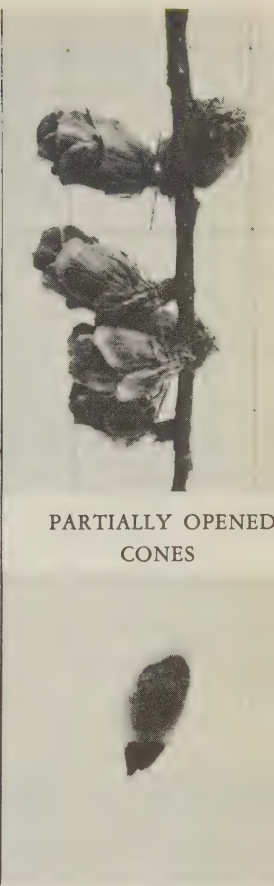
Tamarack is the heaviest and strongest of the softwoods of Eastern and Central Canada. It is resistant to decay and for that reason is suitable for railway ties, posts, and telegraph poles.



NEEDLES AND CONES

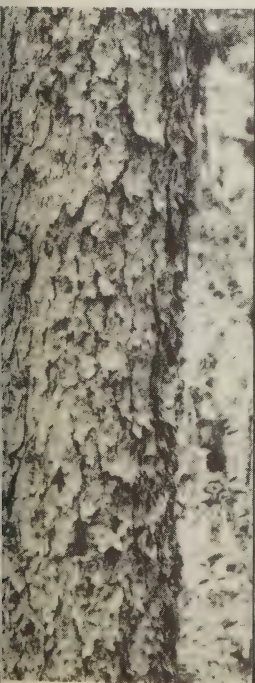


TWIGS IN WINTER



PARTIALLY OPENED
CONES

SEED
ENLARGED THREE TIMES



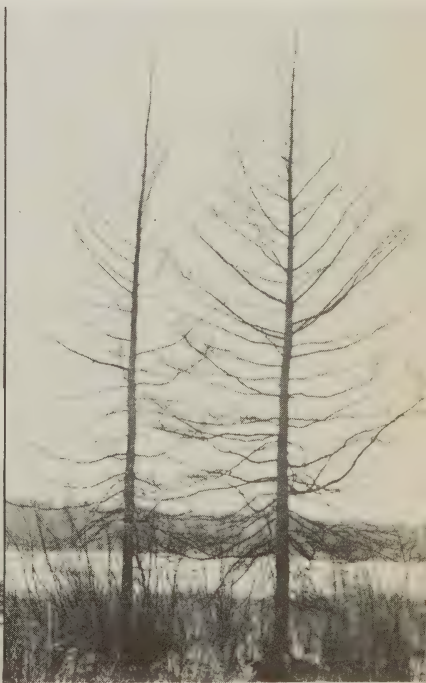
MATURE BARK



FEMALE FLOWERS



MALE FLOWERS



YOUNG TREES IN WINTER

THE LARCHES

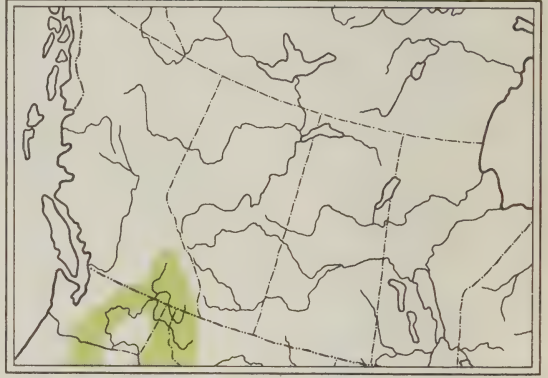
WESTERN LARCH

Larix occidentalis Nutt.

Larch, western tamarack, tamarack.

The western larch is a large and symmetrical tree 100 to 180 feet in height and 3 to 4 feet in diameter. The trunk is very long, usually clear of branches for much of its length, and the crown is very small and narrow when the trees are growing in dense stands. In the open the crown extends farther down the trunk and becomes narrowly spire-like. The branches are short, brittle, and either droop slightly or spread out horizontally from the trunk. A deep, widely spread system of lateral roots make this tree quite windfirm.

In Canada, western larch is confined to the southeastern part of British Columbia, where it is generally found at altitudes between 1,800 and 4,000 feet. It makes its best growth on deep, porous, moist soils, but thrifty trees may be found on relatively dry gravelly sites. It forms pure stands of limited area, or grows in association with Douglas fir, lodgepole pine, Engelmann spruce, and western hemlock.



LEAVES—Needle-like, 1 to $1\frac{3}{4}$ inches long, triangular in cross-section, pale yellow-green, turning pale yellow in the autumn, borne singly on new shoots, arranged in brush-like clusters of 14 to 30 on older twigs.

FLOWERS—Early spring; unisexual; both sexes on the same twig, the male yellow-green, the female red or bright purple.

FRUIT—Early August; an erect oblong cone, 1 to $1\frac{1}{2}$ inches long, the scales usually covered on the lower half with a dense coating of white hair, shorter than the bracts; opening at maturity; falling soon afterwards.

TWIGS—Stout, brittle, at first somewhat downy, later smooth and orange-brown. Buds dark chestnut-brown, about $\frac{1}{8}$ -inch in diameter.

BARK—On young stems, thin, scaly, grey-brown; on old trunks, 3 to 6 inches thick, deeply furrowed into flat, reddish-brown plates covered with thin scales.

WOOD—Heavy, hard, non-porous, dark red-brown with yellow-brown sapwood.

Western larch is one of the important trees in the interior of British Columbia. It has a variety of commercial uses, including general construction, railway ties, and mine timbers.



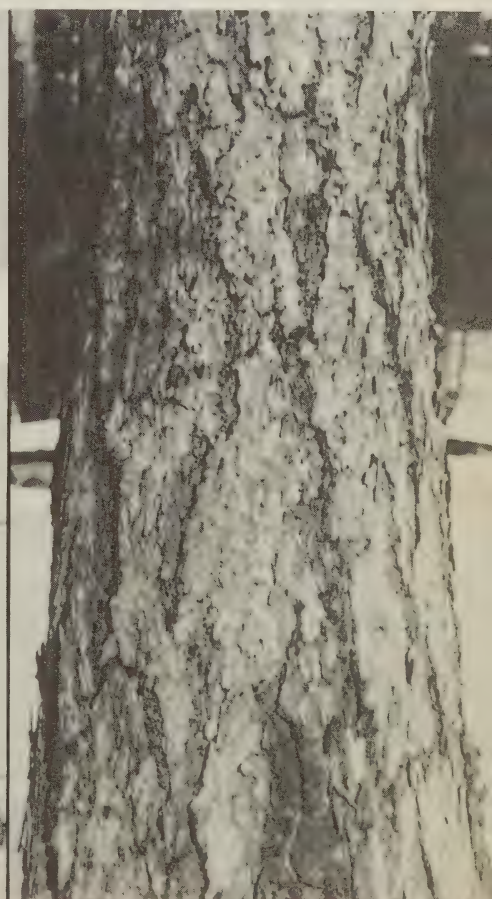
NEEDLES AND OPENED CONES



SEED



OPENED CONE IN WINTER



MATURE BARK

THE LARCHES

ALPINE LARCH

Larix lyallii Parl.

Mountain larch, Lyall's larch, tamarack.

The alpine larch is a tree of the high mountains of Western Canada. It is a small tree, seldom more than 30 to 40 feet in height and 1 to 2 feet in diameter. The trunk tapers rapidly from the base to the top and is very branchy, and in general the whole tree has a stunted appearance. The branches, which extend widely, often droop and are usually turned up at the ends, forming a very irregular crown. They are tough and not brittle, in contrast to those of the western larch. New shoots are covered with a fine whitish down, an important distinguishing characteristic.

This species is strictly a tree of high altitudes, and forms the upper timber-line in the Rocky and Selkirk Mountain Ranges of southern Alberta and British Columbia. Usually it is found at altitudes of 6,500 to 7,000 feet on open, grassy slopes in small pure stands or in association with alpine fir, and with whitebark and limber pine. It will also grow on the rockiest of soils, even in crevices on steep, rugged slopes, provided there is abundant moisture present.



LEAVES—Needle-like, 1 to 1½ inches long, 4-sided in cross-section, pale blue-green, turning yellow in the autumn, borne singly on new shoots, arranged in brush-like clusters of 30 to 40 or more on older twigs.

FLOWERS—Spring; unisexual; both sexes on the same twig, the male yellowish-green, the female red or bright purple.

FRUIT—Early August; an erect, purplish-red cone, 1½ to 2 inches long, the cone scales (shorter than the long, pointed bracts), fringed and covered with long, white hair; opening at maturity, falling soon afterwards.

TWIGS—Stout, tough, mostly covered with dense white woolly down; buds prominent, the scales fringed with long white hair.

BARK—Thin; on young stems smooth, ashy-grey; on old trees indistinctly furrowed, covered with thin, loosely attached, reddish-brown scales.

WOOD—Heavy, hard, coarse-textured, non-porous; nearly white to reddish-brown.

Alpine larch has little commercial value as a timber tree, but is important in controlling run-off and erosion.

ALPINE LARCH



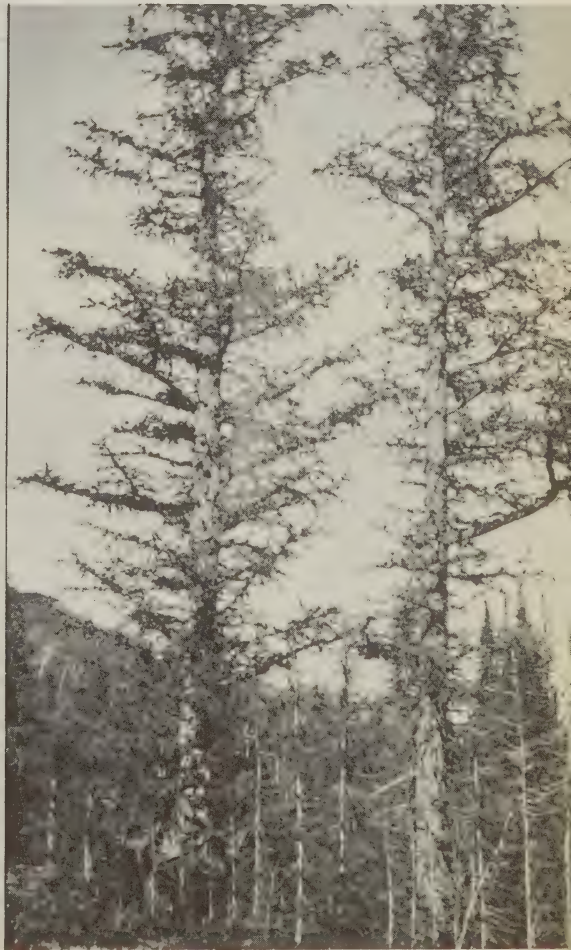
NEEDLES



OPENED CONE



NEEDLES AND CONES



MATURE TREES,
WOLVERINE SUMMIT, YOHO, B.C.

The SPRUCES *Picea* A. Dietr.

The spruces are widely distributed throughout the cooler parts of the northern hemisphere. About 40 species have been named, of which seven are found in North America. Five of these and two varieties are native to Canada. One native species, the red spruce, is found only in the East, and two others, the Sitka and the Engelmann spruces, are confined to the West. The remaining two species, the white and the black spruce, range from the Atlantic Coast westward almost to the Pacific and northward to the limit of tree growth in the arctic regions. The ranges of the two varieties, western white spruce and Porsild spruce, are not fully known as yet, but the first has been reported from Manitoba, Alberta, British Columbia, Mackenzie, and the Yukon, and the second from Mackenzie, southern Yukon, northern British Columbia, and western Alberta. Two foreign species widely planted in Canada for ornamental and other purposes are the Norway spruce, *Picea abies* (L.) Karst., from Europe, and the blue or Colorado spruce, *Picea pungens* Engelm., from the mountains of the Western United States.

The spruces are evergreen trees and have long, often cone-shaped crowns and straight, gradually tapering trunks. They have thin, scaly bark and slender, often drooping, lower branches. In the open the branches usually extend down the trunk nearly to the ground. Since the root systems are nearly always shallow, spruce trees are easily uprooted by wind.

The short, needle-like leaves are stiff and sharp-pointed, and, with one exception, are 4-sided in cross-section. They are single and stemless, and each is attached to a tiny peg-like base. They never appear to be 2-ranked, as is often the case with the firs and hemlocks, but either bristle out all around the twig or are curved and twisted toward the upper side.

Spruce flowers are unisexual—either male or female, never both—but the two sexes are found on the same tree. The mature cones always droop from the branches. They ripen in the autumn of the first season, open to discharge the seeds, and then either drop off before the new crop is formed, or in one case remain on the tree for many years. The seeds are very light and each has a broad wing attached to one end.

The Norway spruce is easily distinguished from the Canadian spruces by its yellowish-green foliage and much larger cones. The blue spruce is distinguished chiefly by the colour of its leaves and the smooth, hairless twigs.

The wood of the different species is very similar in colouring and mechanical properties. Light-weight spruce timber resembles somewhat that of the white pines and it is often used for the same purposes. Its light colour, its freedom from resin, and the length and strength of the fibres make spruce the premier pulpwood of the world. It is also widely used in general construction, interior finish, and boxes and crating. Its tasteless character makes it of exceptional value for food containers.

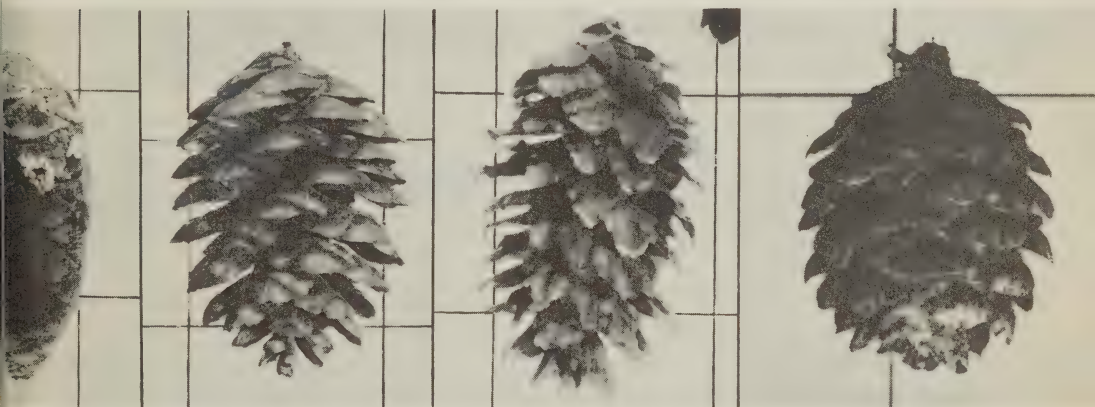
THE SPRUCES



WHITE SPRUCE

WESTERN WHITE SPRUCE

BLACK SPRUCE



RED SPRUCE

ENGELMANN SPRUCE

BLACK SPRUCE



NORWAY SPRUCE

SITKA SPRUCE

BLUE SPRUCE

THE SPRUCES

WHITE SPRUCE

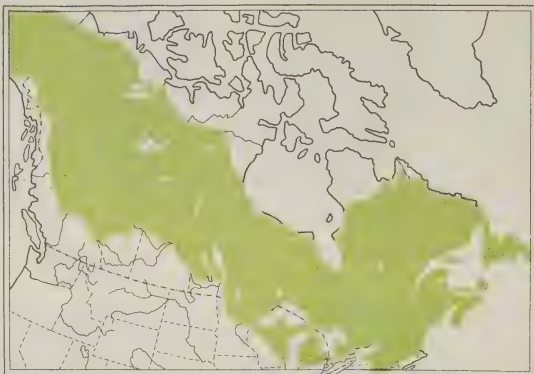
Picea glauca (Moench) Voss

Single spruce, skunk spruce, northern spruce,
pine, cat spruce, yellow spruce.

In favourable situations the white spruce may reach a height of 120 feet and a diameter of 4 feet. The average height is much less, however, being about 80 feet with a diameter of 2 feet. The trunk is often very branchy and the crown is deep and symmetrical except in dense stands. At a distance the crown has a spire-like appearance. The root system is usually a shallow mass of small rootlets spreading below the surface of the ground.

This spruce ranges across Canada from the Atlantic Coast to Alaska. Along with black spruce and tamarack it forms the northern limit of tree growth. It grows best on a well-drained, moist soil along streams and around the borders of swamps. It forms pure stands of limited area and also mixes with the red and black spruces, balsam fir, white birch, and the aspens, and to a certain extent with Engelmann spruce and alpine fir in the valleys of the Rocky Mountains.

The variety *porsildii*, the Porsild spruce, was described by Raup in 1947. It has been reported from Mackenzie, the Yukon, western Alberta and northern British Columbia. It differs chiefly from the other white spruces in having almost smooth bark, spotted with resin blisters.



LEAVES—Needle-like, 4-sided in cross-section, stiff, sharp-pointed, usually twisted and crowded towards the upper side of the twigs, $1/3$ to $3/4$ of an inch long, bright green, emitting a rank, pungent odour when bruised.

FLOWERS—May-June; unisexual, the male pale red, soon appearing yellow, the female with red or yellow-green scales, both sexes on the same tree.

FRUIT—Autumn; a cylindrical, pale green (sometimes with a reddish tinge) pendent cone, turning brown at maturity; $1\frac{1}{2}$ to 2 inches long, the scales thin, flexible, straight or slightly rounded and smooth on the margins; opening at maturity, falling before a new crop is formed.

TWIGS—Slender, smooth or only sparsely hairy, orange-brown to grey; buds blunt, $1/8$ to $1/4$ of an inch long with overlapping chestnut-brown scales.

BARK—Thin, ash-brown to silvery, the outer layers separating into thin, closely attached scales; inner bark streaked with reddish-brown layers.

WOOD—Light, soft, straight-grained, non-porous; nearly white to pale yellowish-brown.

White spruce is widely used for pulpwood and lumber. The wood is noted for its resilience. It has good resonance, a feature of value for sounding boards in musical instruments.

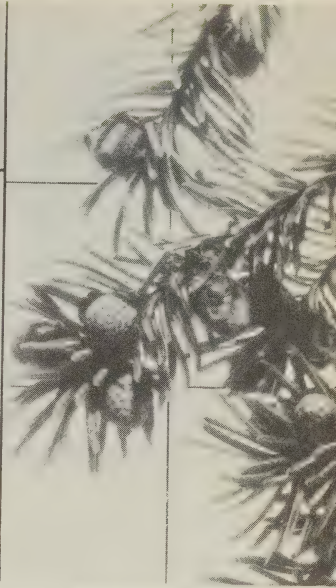
WHITE SPRUCE



MATURE CLOSED CONES



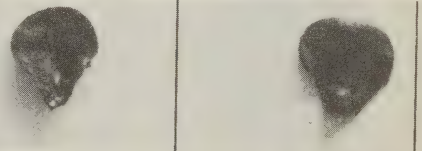
OPENED CONE



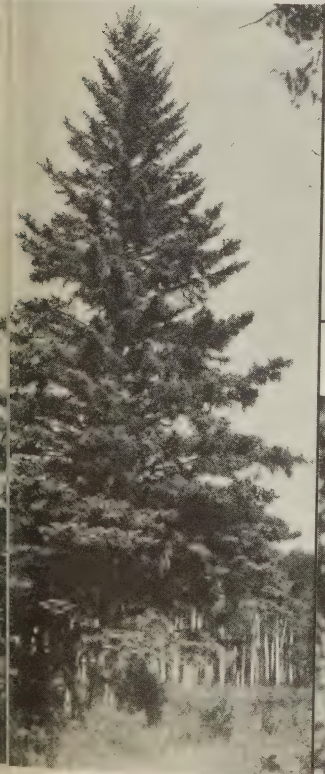
PARTIALLY OPENED
FEMALE FLOWERS



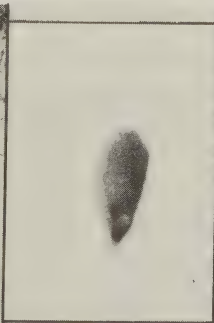
TWIG, LEAF BASES AND BUDS



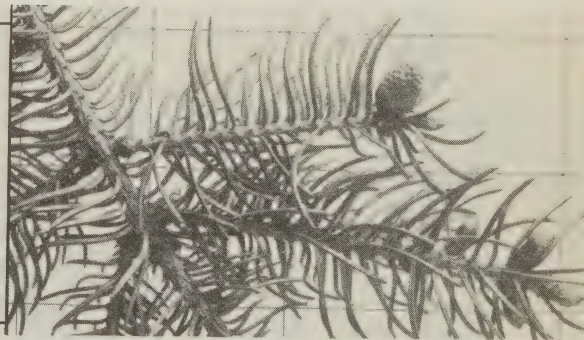
CONE SCALES



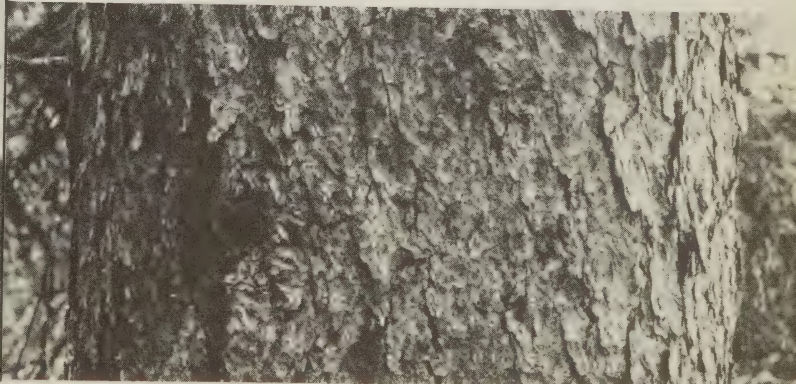
RE, RIDING MOUNTAIN
ATIONAL PARK, MANITOBA



SEED



PARTIALLY OPENED MALE FLOWERS



MATURE BARK

THE SPRUCES

WESTERN WHITE SPRUCE

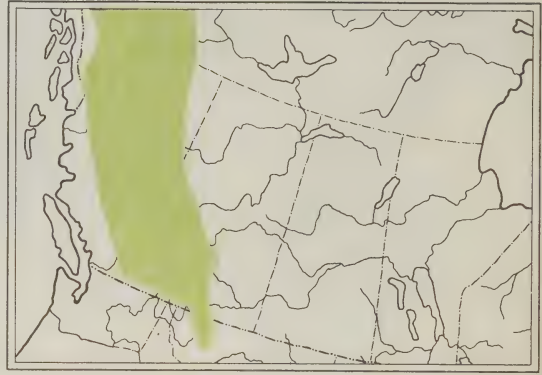
Picea glauca (Moench) Voss
var. *albertiana* (S. Brown) Sarg.

White spruce, Alberta spruce,
Black Hills spruce.

The western white spruce was described by Stewardson-Brown in 1907 from specimens found in Alberta. It is a tree up to 160 feet in height and 3 to 4 feet in diameter with a long, very narrow crown.

This tree has been reported from Manitoba westward almost to the Pacific. Its northern limit has yet to be defined. Its range overlaps that of Engelmann spruce on the eastern slope of the Rocky Mountains and in south central British Columbia. These two trees resemble one another so closely that without the cones they are practically indistinguishable. In general, western white spruce occupies the lower slopes and valleys, and mixes with Engelmann spruce only at higher elevations.

Western white spruce makes its best growth on moist alluvial soils along river banks, around the margins of lakes and swamps, and on old stream terraces, but is also found on shallow soils and low mountainsides. It grows in pure stands and associated with white spruce, alpine fir, lodgepole pine, balsam poplar, trembling aspen, and white birch.



LEAVES—Needle-like, stiff, sharp-pointed, 4-sided in cross-section, twisted and crowded toward the upper side of the twig, $\frac{1}{2}$ to 1 inch long, blue-green.

FLOWERS—May-June, male light red to yellow; female red or yellow-green.

FRUIT—September, a cylindrical cone 1 to $2\frac{1}{4}$ inches long, about 1 inch in diameter when open, greenish at first, turning brown at maturity. Cone scales thin, stiff, fan-shaped, with smooth or at most very faintly toothed margins; opening at maturity, falling during the winter.

TWIGS—Hairless or with minute hairs on the peg-like leaf bases, light yellow or grey. Buds ovoid, chestnut-brown, $\frac{1}{8}$ to $\frac{1}{4}$ inch long, slightly resinous, the terminal bud with long, pointed, basal scales.

BARK—Thin, covered with small greyish-brown scales, occasionally slightly fissured at the base of old trunks.

WOOD—Light, soft, straight-grained, non-porous; nearly white to pale yellowish brown.

It is used extensively for lumber and has a high potential value as a pulpwood species.

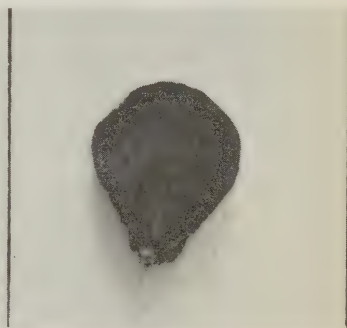
WESTERN WHITE SPRUCE



NEEDLES AND MATURE CONES



OPENED CONE



CONE SCALE



MATURE TREES, UPPER LIARD RIVER, YUKON

THE SPRUCES

BLACK SPRUCE

Picea mariana (Mill.) BSP.

Red spruce, double spruce,
water spruce, swamp spruce.

The black spruce is generally a small, slow-growing tree, 30 to 50 feet in height and 6 to 10 inches in diameter, although on favourable sites it may reach a height of 100 feet and a diameter of 3 feet. On the tundra and bogs in the north it is often dwarfed to a mere shrub. The trunk is straight and has little taper. Young trees develop narrow, symmetrical crowns of short, slender, mostly horizontally spreading, branches. On old trees the crowns are open and irregular with mostly drooping branches, which turn up at the ends. On wet sites, the root system is a shallow compact mass of many rootlets spreading just below the surface. The roots go deeper on well-drained sites and the tree is then quite windfirm.

The black spruce ranges across Canada from the Atlantic Coast to northern British Columbia and Alaska. In the southeast it is confined mostly to sphagnum bogs and the margins of swamps; in the north and west it is more often found on stony slopes and the drier hillsides. It grows in pure stands or in mixtures with white spruce, balsam fir, jack pine, tamarack, white birch, and trembling aspen.

On sites covered with mosses, black spruce often spreads by 'layering'; a lower branch becomes buried in the moss where it takes root. The tip of the branch then develops into a tree.



LEAVES—Needle-like, 4-sided in cross section, sharp-pointed, sometimes spreading away from the lower side of the twig, $\frac{1}{2}$ to $\frac{3}{4}$ inch long, blue-green.

FLOWERS—May-June; unisexual, male dark red, female purple, both on the same tree.

FRUIT—August, an ovoid, purplish-green cone $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, brown and spherical when open, the scales stiff, rounded, with irregularly toothed markings; opening at maturity, but often remaining on the tree for many years.

TWIGS—Moderately slender, hairy, reddish-brown; buds sharp-pointed, about $\frac{1}{8}$ of an inch long, light reddish-brown, covered by several rows of long, awl-shaped, basal scales.

BARK—Thin, scaly, greyish to reddish-brown; inner bark usually olive-green.

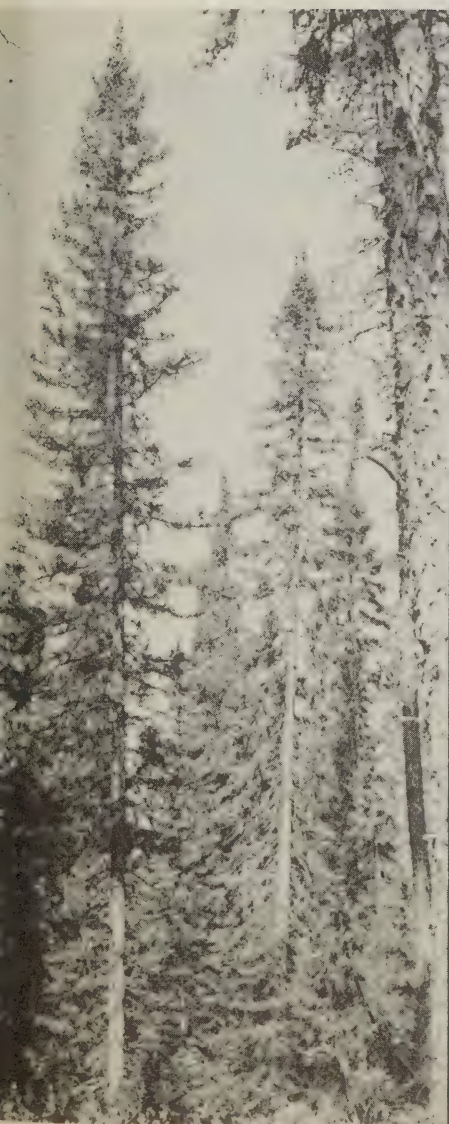
WOOD—Moderately light and soft, straight-grained, non-porous; yellowish-white with paler sapwood.

Black spruce is valued especially for pulpwood; owing to the comparatively small sizes attained by the tree it is not used for saw-timber to the same extent as the other spruces. It is also used for mine timbers and similar purposes.

BLACK SPRUCE



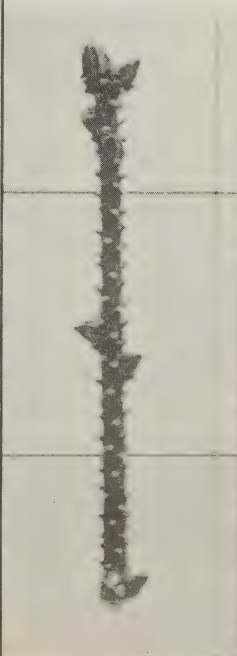
MATURE CONES



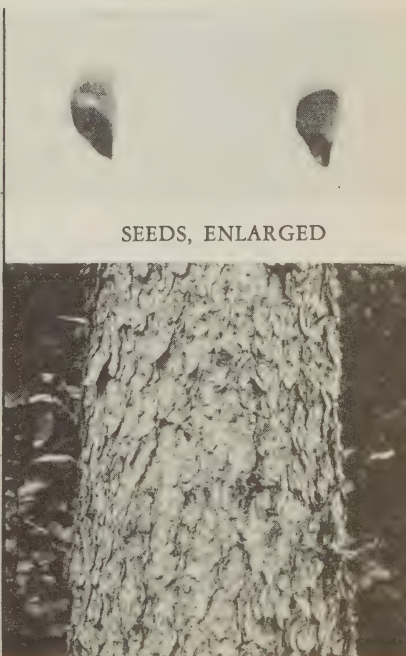
MATURE TREES.
UPPER LIEVRE RIVER, QUE.



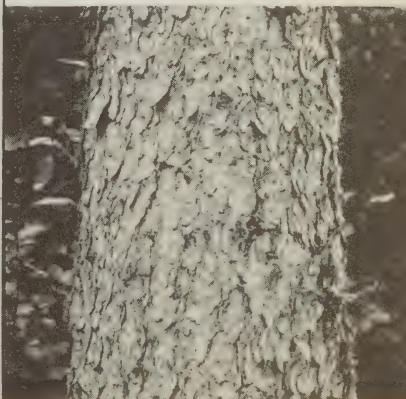
NEEDLES



TWIG, LEAF
BASES AND BUDS



SEEDS, ENLARGED



MATURE BARK

THE SPRUCES

RED SPRUCE

Picea rubens Sarg.

Yellow spruce, spruce.

The red spruce is usually a medium-sized tree, 50 to 90 feet high and 1 to 2 feet in diameter. The trunk is very straight and generally has little taper. The crown is conical and narrow, and in the open the branches extend down the trunk nearly to the ground. The middle and upper branches grow out more or less at right angles to the trunk and then curve up at the ends. The lower branches usually droop. A shallow but wide-spreading, fibrous root system makes this tree moderately wind-firm.

Red spruce is common in Nova Scotia, Prince Edward Island, New Brunswick and southern Quebec, but it has only a limited distribution in eastern Ontario. It grows on many types of soils but reaches its largest size on well-drained loams in moist valleys in association with balsam fir, white spruce, yellow birch, sugar maple, and hemlock. It rarely forms pure stands.

The red spruce is easily distinguished from the white spruce by its orange-brown, hairy twigs, and ovoid cones with slightly toothed scales. It is distinguished from the black spruce by its bright yellow-green foliage, by the shape of the cones, and by the single ring of long-pointed scales surrounding the terminal buds.



LEAVES—Needle-like, 4-sided in cross-section, stiff, sharp-pointed, curved toward the upper side of the twig, $\frac{1}{4}$ to $\frac{5}{8}$ of an inch long, bright yellow-green.

FLOWERS—May; unisexual; the male bright red, the female purple, both on the same tree.

FRUIT—September; an ovoid, green to purplish-green cone, $1\frac{1}{4}$ to 2 inches long, the scales stiff, rounded, and entire or slightly toothed on the margins; turning reddish-brown, opening at maturity, falling during the winter.

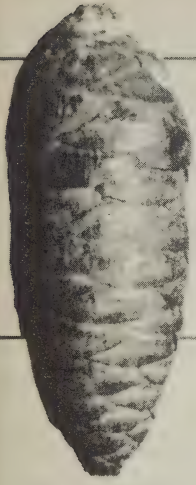
TWIGS—Moderately stout, more or less hairy, orange-brown; buds up to $\frac{1}{4}$ of an inch long, pointed, reddish-brown, the terminal with a ring of long-pointed scales.

BARK—Thin, the outer layers separating into small, thin, closely attached reddish-brown scales; inner bark buff-coloured.

WOOD—Light, moderately soft and strong, straight-grained, non-porous; nearly white to light yellowish-brown.

The wood of the red spruce is used for pulpwood, general construction, boxes and crates. It is similar to that of the white and black spruces and is usually marketed with them under the common trade name of "spruce".

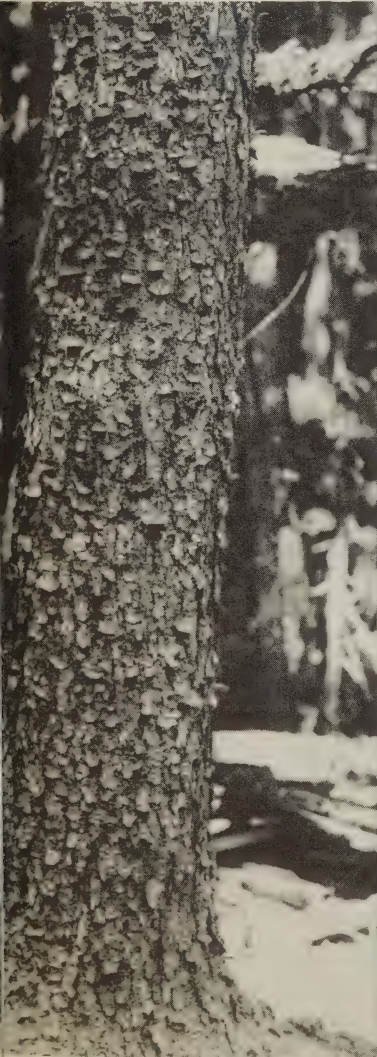
RED SPRUCE



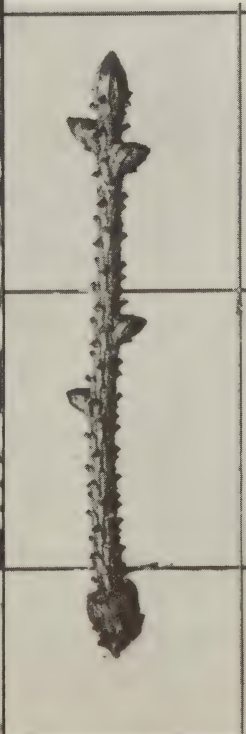
MATURE CLOSED CONE



NEEDLES

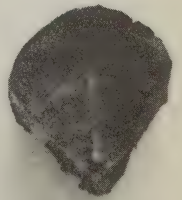


MATURE BARK

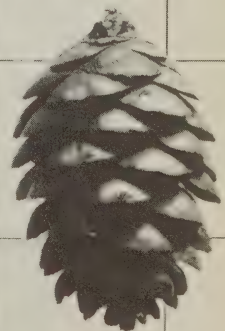


TWIG, LEAF, BASES,
AND BUDS

CONE
SCALE



SEED



OPENED CONE

THE SPRUCES

ENGELMANN SPRUCE

Picea engelmanni Parry

**Mountain spruce, Rocky Mountain spruce,
western white spruce.**

The Engelmann spruce is typically a mountain species, and the most beautiful of our native spruces. It ordinarily attains a height of 100 to 150 feet and a diameter of 1½ to 3½ feet, but trees 6 feet in diameter and 180 feet high are not unknown. The crown is symmetrical, narrow, and spire-like, and, except in very dense stands, the branches extend down the trunk nearly to the ground. The lower branches are often drooping.

This spruce is common throughout the interior mountain region of southern and central British Columbia, and on the eastern slope of the Rocky Mountains in Alberta. It does not occur west of the Coast Mountains, or, so far as is yet known, north of the Nechako River and the Big Bend of the Fraser River. It grows in pure or mixed stands in high valleys and on mountain slopes at altitudes from 3,000 to 6,000 feet in southern British Columbia and in the north from 1,000 to 4,000 feet. Its best growth is made on deep, rich, loamy soils with a high moisture content. It occasionally shares new burns with lodgepole pine.



LEAVES—Needle-like, 4-sided in cross-section, usually blunt-pointed, soft and flexible, usually crowded and curved toward the upper side of the twig; ½ to 1 inch long, bluish-green; giving off a disagreeable odour when crushed.

FLOWERS—Spring; unisexual; male dark purple, female bright scarlet, both on the same tree.

FRUIT—August, a cylindrical, light brown cone, 1 to 3 inches long, the scales thin, wedge-shaped, flexible, mostly toothed; opening at maturity, falling during the autumn and winter.

TWIGS—Moderately stout, minutely hairy, light brown to grey; buds 1/8 to ¼ of an inch long, conical, pointed, chestnut-brown with rounded scales.

BARK—Thin, brownish to cinnamon-red; the outer layers broken into small, thin, loosely attached scales.

WOOD—Light, soft, fine-textured, straight-grained, non-porous; white to pale yellow.

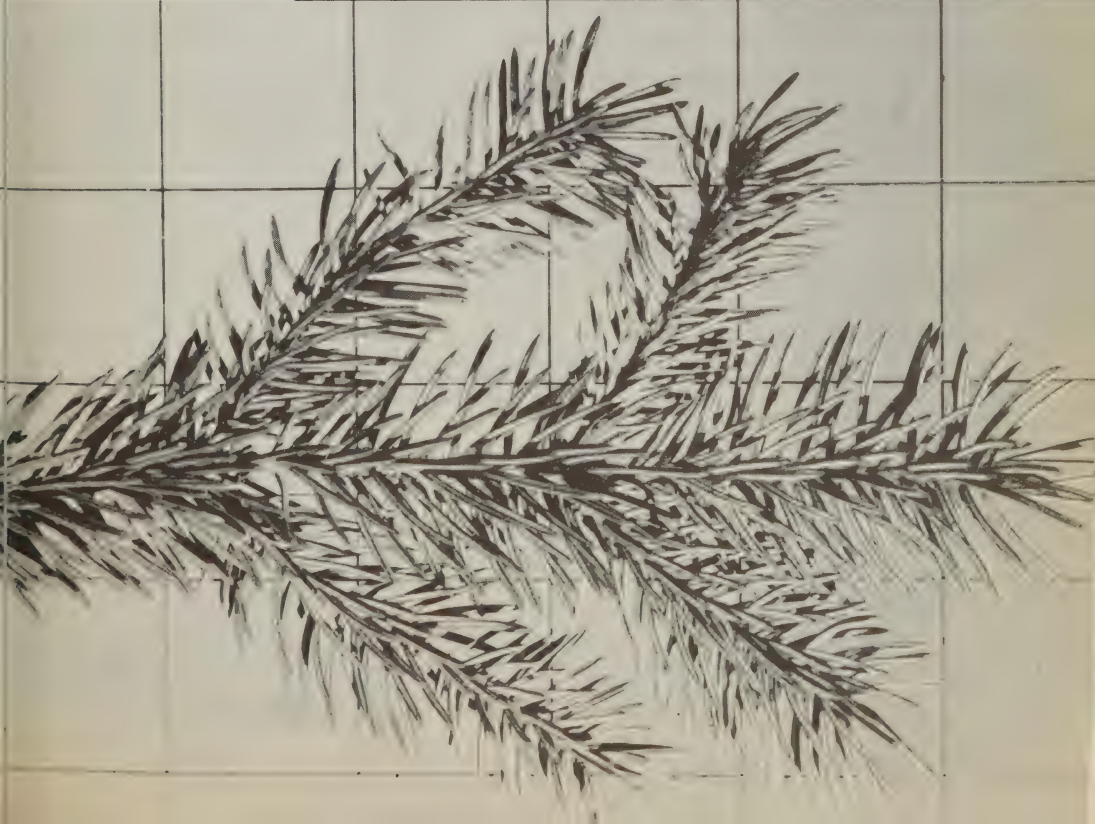
This is one of the most important species in the interior of British Columbia. The wood, usually sold as mountain spruce, competes with western white spruce in the markets of Western Canada. It is used for general construction, interior finish, and makes excellent pulp. Its bluish leaves make the tree very popular for ornamental planting.

ENGELMANN SPRUCE

IE SCALES

EDLES AND CONES

EDLES



SITKA SPRUCE

Picea sitchensis (Bong.) Carr.

Menzies spruce, tideland spruce, coast spruce.

The Sitka spruce is the largest and most imposing of all the spruces. Mature trees are commonly 3 to 6 feet in diameter and 125 to 175 feet in height, but sometimes are found 8 to 12 feet in diameter and up to 250 feet high. In dense stands this tree produces a long, clear trunk, often buttressed at the base. The crown on forest trees is short and rather open. The branches grow out horizontally, frequently with many slender, drooping branchlets. The root system, although shallow, is wide-spreading.

The Sitka spruce is confined in Canada to the coastal region of British Columbia and the southwest corner of Yukon. It seldom extends inland more than 50 miles from salt water or to an altitude exceeding 1,000 feet. It is most abundant in the northern portion of its range, especially on the Queen Charlotte Islands. It grows in pure stands or in mixtures of Douglas fir, western red cedar, red alder, broadleaf maple, and black cottonwood. Its best growth is made on a deep, moist soil in a humid climate.



LEAVES—Needle-like, slender, flattened in cross-section, stiff, sharp-pointed, bristling out all around the twig, $\frac{1}{2}$ to $1\frac{1}{8}$ inches long, light yellow-green above, bluish-white below.

FLOWERS—Early spring; unisexual; the male dark red, both sexes on the same tree.

FRUIT—Autumn; a cylindrical, pale yellow to reddish-brown cone, $2\frac{1}{4}$ to 4 inches long, the scales thin, stiff, rounded to wedge-shaped, wavy-edged, or irregularly and finely toothed on the margins; opening at maturity; falling during the late autumn and early winter.

TWIGS—Stout, stiff, hairless, orange-brown; buds pointed, $\frac{1}{4}$ to $\frac{1}{2}$ inch long, chestnut-brown, the scales often tipped with short points.

BARK—Very thin, broken into large, thin, loosely attached, reddish-brown scales.

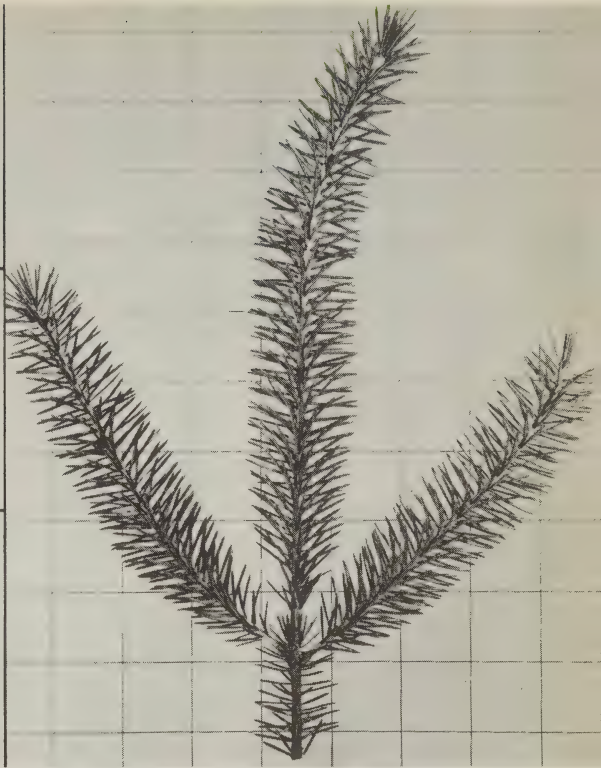
WOOD—Moderately light and soft, straight-grained, non-porous; light yellow to pale brown with light yellow to creamy-white sapwood.

This tree is one of the most important timber species in British Columbia. By virtue of its large size and high proportion of defect-free stock, it is admirably suited for aircraft construction. It is also valuable for pulp.

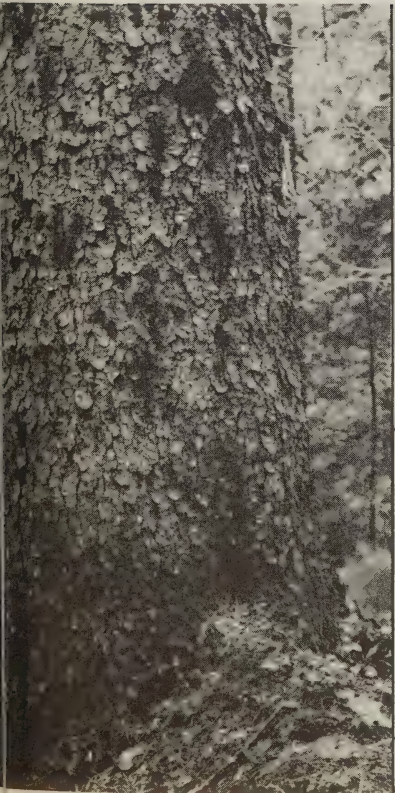
SITKA SPRUCE



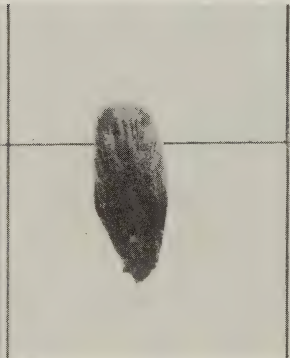
OPENED CONE



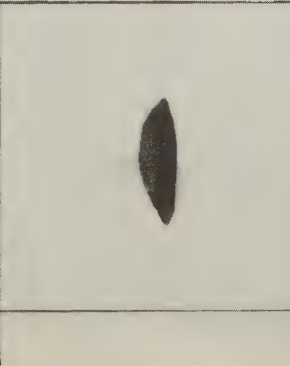
NEEDLES



MATURE BARK



CONE SCALE



SEED



CLOSED CONE

The HEMLOCKS *Tsuga* (Endl.) Carr.

The hemlocks comprise approximately 10 species of evergreen trees confined to the forests of Eastern and Western North America, Japan, Formosa, China, and the Himalayan Mountains. Four species occur in North America, of which 3 are found in Canada. Two species, western hemlock and mountain hemlock, are confined to parts of British Columbia, the third, eastern hemlock, ranges from Cape Breton Island westward to Lake Superior. Hemlocks do not now form a part of the European forests but fossil hemlock wood has been discovered in various sections of that continent.

Hemlocks are tall, mostly pyramidal, trees with slender, horizontal or slightly drooping branches, and a characteristically nodding or somewhat drooping leading shoot. The leaves are easily distinguished from those of any other native coniferous tree. They are flattened or semicircular in cross-section, rounded or blunt-pointed, and are attached by tiny thread-like stems to woody projections on the side of the twig. No other native evergreen has this method of leaf attachment. The leaves are spirally arranged on the twigs but are usually curved and twisted so as to appear 2-ranked.

The unisexual male and female flowers are found on the same or on different branches of the same tree. They occur as small cone-like bodies which may be greenish, yellowish, or purplish. The fruit, a pendent, woody cone composed of thin scales, matures at the end of the first growing season. It opens soon after maturity to release the small, terminally winged seeds. The cone scales are several times longer than the bracts and only the middle scales are fertile.

Hemlock bark is as a rule characteristically rough, hard, and deeply furrowed on old trees. The inner bark is a bright cinnamon-red. The bark of the eastern hemlock is rich in tannin and for many years it was one of the main commercial sources of this material in Eastern North America.

The hemlocks are classed as tolerant trees since they have the capacity to grow in competition with, and in the shade of, other trees. They are popular for ornamental planting and will withstand a considerable amount of pruning.



CEDAR

HEMLOCK

CEDAR

WESTERN HEMLOCK AND WESTERN RED CEDAR, READ BAY, B.C.

THE HEMLOCKS

EASTERN HEMLOCK

Tsuga canadensis (L.) Carr.

Hemlock, Canadian hemlock, hemlock spruce, white hemlock.

The eastern hemlock is a medium-sized tree, 60 to 70 feet in height and 1½ to 2 feet in diameter. The trunk is usually straight, but much tapered from the base upwards. Growing in the open the tree is very branchy, with a large, cone-shaped crown, but in dense stands the crown is short and narrow. The branchlets are very slender and flexible, and are roughened by the raised woody projections left after the leaves have fallen. The fibrous root system goes well into the ground on deep soils.

It is found throughout the Maritime Provinces, in southwestern Quebec, and in southern Ontario as far west as Lake Superior. Its range is quite similar to that of the sugar maple and yellow birch, though slightly less extensive, and the three species are often found in the same stand. It sometimes forms pure stands, but is more often mixed with white pine, the red and white spruces, balsam fir, and various hardwoods. It is very tolerant of shade.

The leaves are the most reliable distinguishing feature. They are flat, blunt-pointed, always appear to be arranged in two ranks, and each is attached by a tiny, thread-like stalk to the side of the twig. No other eastern coniferous species has a stalked leaf.



LEAVES—Narrowly elongated, flattened in cross-section, blunt, distinctly stalked, always appearing 2-ranked, 1/3 to 2/3 of an inch long; dark green and grooved above, marked with 2 white lines below.

FLOWERS—May; unisexual; male yellow, female pale green, both on the same tree, usually on the same branch.

FRUIT—Autumn; a small, short-stalked cone, pale green at first, turning red-brown at maturity, ½ to ¾ inch long, the scales thin, with rounded and slightly toothed margins; opening during the autumn and early winter, falling soon afterwards.

TWIGS—Slender, hairy and yellow-brown at first; buds 1/16 of an inch long, blunt, chestnut-brown.

BARK—Reddish or greyish-brown, scaly, becoming deeply furrowed into broad ridges.

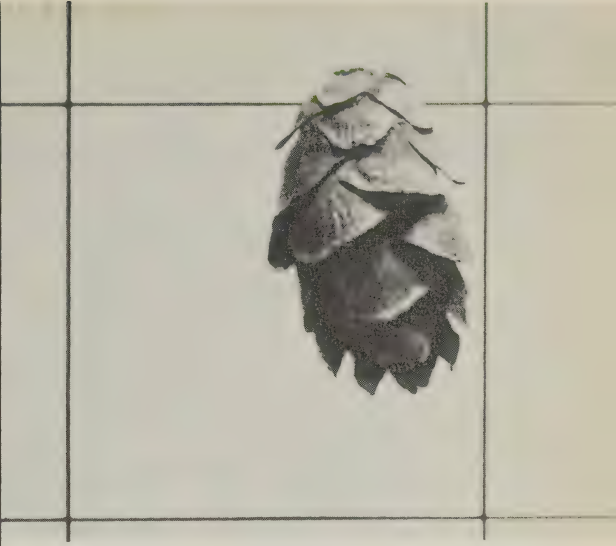
WOOD—Light, moderately hard, non-porous; light brown with paler sapwood.

The wood of eastern hemlock is harder than most softwoods and is somewhat coarse-textured with a sharp contrast in hardness between springwood and summerwood. It is used for timbers and general construction, boxes and crates, railway ties, and pulp.

EASTERN HEMLOCK



LEAVES



OPENED CONE



SEEDS



MATURE CLOSED CONES



MATURE BARK

THE HEMLOCKS

WESTERN HEMLOCK

Tsuga heterophylla (Raf.) Sarg.

Hemlock, British Columbia hemlock, Alaska pine.

The western hemlock is a large, graceful tree, frequently 120 to 160 feet in height and 3 to 4 feet in diameter. The crown is narrow, pyramidal in outline, and very dense. The branches are slender, and the branchlets and twigs drooping. The tip or leader is slender, whip-like, and drooping. The trunk is usually clear for three-quarters of its length in dense stands. The base of the trunk is often much swollen or thickened. The root system is shallow and wide-spreading.

Western hemlock occurs throughout the coastal and interior wet belts in British Columbia. In the interior it is found up to 5,000 feet in altitude wherever there is abundant rainfall. It thrives best on deep, porous soils, but will grow on thin, poor ones if there is sufficient moisture. It usually forms mixed stands with Douglas fir, Sitka spruce, and western red cedar at lower elevations, and mountain hemlock and alpine fir on higher ground. It rarely forms pure stands.



LEAVES—Narrowly elongated, flattened in cross-section, round-pointed, always appearing 2-ranked, distinctly stalked, $\frac{1}{4}$ to $\frac{3}{4}$ of an inch long; dark shiny green and grooved above, marked with 2 white bands below.

FLOWERS—Spring; unisexual; the male yellow, the female greenish, both on the same tree.

FRUIT—August; an ovoid, light brown cone, $\frac{3}{4}$ to 1 inch long, the scales thin with more or less wavy edges; opening in September, falling during the winter.

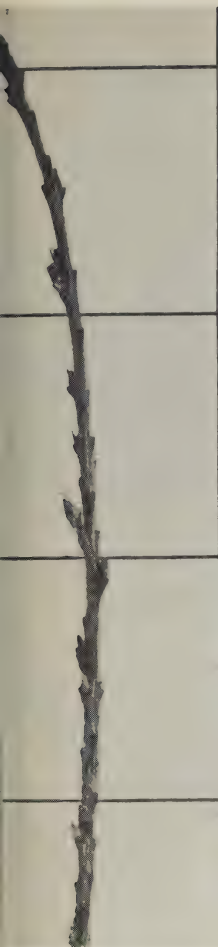
TWIGS—Slender, hairy, at first pale yellow-brown, later dark reddish-brown; buds ovoid, about $\frac{1}{16}$ of an inch long, bright chestnut brown.

BARK—At first russet-brown, covered with fine scales; becoming darker and furrowed into flat, scaly ridges.

WOOD—Moderately heavy and hard, fine-textured, non-porous; pale yellow-brown with white sapwood.

Western hemlock is a valuable British Columbia pulpwood species. It is also used extensively for lumber, general construction, boxes and crates, flooring, and railway ties.

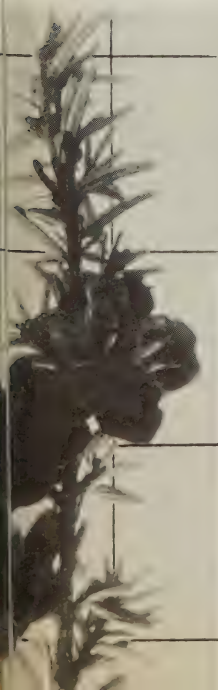
WESTERN HEMLOCK



TWIG



LEAVES



◀ OPENED CONES

MATURE
CLOSED CONES ▶



THE HEMLOCKS

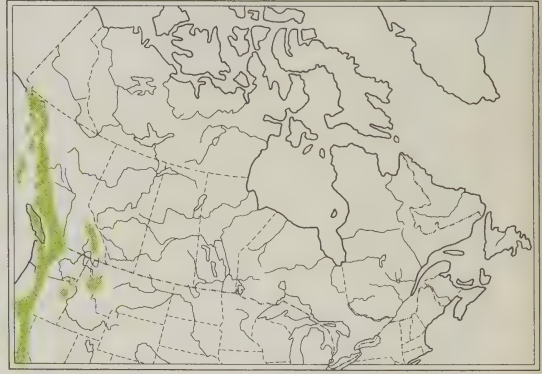
MOUNTAIN HEMLOCK

Tsuga mertensiana (Bong.) Carr.

Black hemlock.

The mountain hemlock is usually a small tree 25 to 50 feet in height and 10 to 20 inches in diameter, although larger trees are not uncommon. On wind-swept ridges at timber-line it is often reduced to a low, scrubby form. The trunk is frequently excessively tapered, and except when the tree is growing in a dense stand carries its branches down nearly to the ground. The crown is narrowly pyramidal in youth, becoming irregular with age. The branches are slender and usually somewhat drooping, but often have erect twigs and side branchlets.

This tree is found throughout the coastal belt in British Columbia and in the mountains of the Columbia and Skeena River systems, mostly at high altitudes. In the coastal belt it is usually found near timber-line at altitudes of 2,500 to 6,000 feet, sometimes descending nearly to sea-level in the more exposed and wetter situations in the north. It makes its best growth on cool, deep, moist soils of a northern exposure. It grows in pure stands or mixed with alpine fir, alpine larch, Engelmann spruce, and white-bark pine.



LEAVES—Narrowly elongated, semi-circular in cross-section, blunt, distinctly stalked, bristling out all around the twig, $\frac{1}{2}$ to 1 inch long; bluish-green above and below.

FLOWERS—Spring; unisexual; male purple, female purple or green, both sexes on the same tree.

FRUIT—Autumn; a cylindrical, yellowish-green to purple cone, $\frac{1}{2}$ to 3 inches long, the scales slightly thickened, rounded, more or less toothed on the edges; opening September-October, falling during the winter.

TWIGS—Usually erect, slender to stout, downy, red-brown; buds conical, about $\frac{1}{8}$ of an inch long, red-brown, the outer scales with awl-like tips.

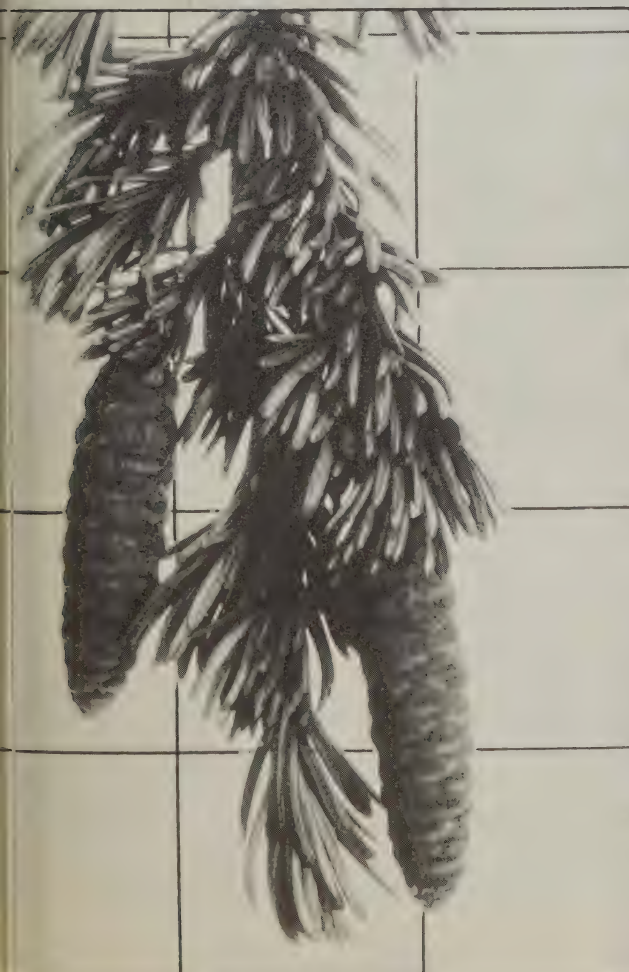
BARK—Dark reddish-brown, roughened by hard, narrow, rounded ridges.

WOOD—Light, soft, close-grained, non-porous; pale brown to red with nearly white sapwood.

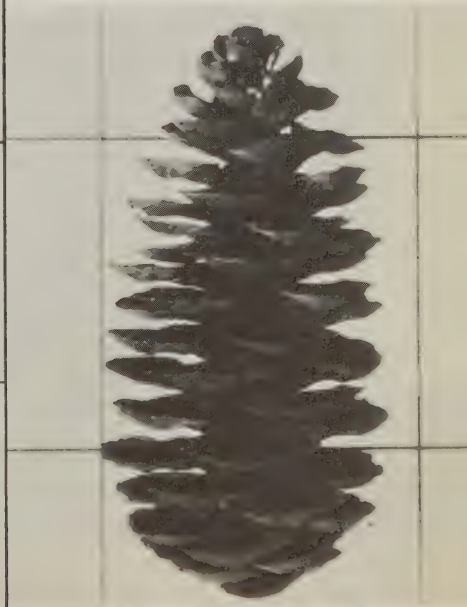
This species is of slight commercial importance in Canada owing to its relative inaccessibility. Whenever it is found with western hemlock it is cut and marketed with that species. It is very useful in protecting slopes against erosion.



LEAVES AND OPENED CONE



LEAVES AND CLOSED CONES



FULLY OPENED CONE

The DOUGLAS FIRS *Pseudotsuga* Carr.

The Douglas firs (or "false hemlocks" as their botanical name implies) are a small genus of 4 or 5 species of which 2 are natives of Western North America. The other species are found in China and Japan. Only 1 of the North American species, the Douglas fir itself, is found in Canada. Two forms of this tree are recognized. The species or coast form is confined mostly to the islands and mainland of the west coast. It is the largest and most majestic tree in Canada. The second form, the blue Douglas fir, is classed as a variety. It occurs throughout the southern parts of the Rocky Mountain region of British Columbia and Alberta.

The Douglas firs are evergreen trees with slender, irregularly whorled branches, and thin to very thick bark. The root systems are strong and widespreading. The crowns are sharply pyramidal at first, becoming rounded or somewhat flat-topped with increasing age.

The name "false hemlock" is derived from the resemblance of the flexible, flattened, bluntly-pointed leaves to those of the true hemlock. The leaves are slightly narrowed at the base and leave the twig marked with rounded, slightly elevated scars upon removal or when shed. Although borne singly and spirally arranged around the twig, they sometimes appear to be 2-ranked, owing to a twisting of the lower leaves into a horizontal position. The winter buds are a very conspicuous feature. They are about $\frac{1}{4}$ of an inch long, very sharp-pointed, and are covered with numerous overlapping, shiny, orange-red scales.

The male and female flowers are borne separately on different parts of the same branch. The fruit is a woody, reddish-brown cone which matures at the end of the first growing season. It is oval in shape and always drooping or pendent on the branch. Each cone scale has a long 3-forked bract attached to its underside. These bracts protrude from between the scales and are an important distinguishing feature; no other native coniferous tree has this type of cone bract. Two terminally-winged seeds are borne under each cone scale. Owing to their small size and relatively large wings they are easily carried some distance by the wind.

As a source of large and strong structural timbers the Pacific Coast Douglas fir is unsurpassed. Its pronounced growth-ring figure, which may be either emphasized or reduced by proper finishing, gives a striking effect to interior woodwork, where the timber finds extensive uses. Edge-grain flooring, both for dwelling-houses and industrial purposes, water-pipes, silos, cooperage, veneer, plywood, railway ties, poles, and piling are some of its various channels of utilization.



DOUGLAS
FIR

WESTERN
RED CEDAR

WESTERN
HEMLOCK

DOUGLAS
FIR

TREES AT ROCK BAY, BRITISH COLUMBIA

THE DOUGLAS FIRS

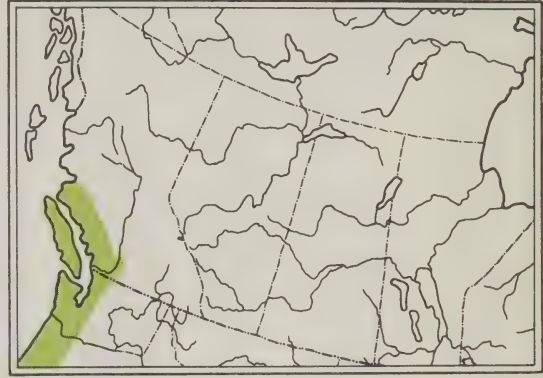
DOUGLAS FIR

Pseudotsuga taxifolia (Poir.) Britt.

British Columbia fir, red fir, yellow fir, Douglas spruce, Douglas pine, Oregon pine, Oregon spruce.

The Douglas fir is the largest tree in Canada. It commonly attains a height of 150 to 200 feet and a diameter of 3 to 6 feet. Occasional trees over 300 feet in height and 15 feet in diameter are found on the best sites. The trunk is straight and frequently free of branches for a distance of 70 feet or more above the ground. The crown is sharply pyramidal in outline at first, becoming rounded or even flat-topped on old trees. The branches develop many long, drooping side branchlets. A strong, fibrous, but wide-spread root system gives this tree excellent support.

This tree is the coast form of the Douglas fir. It is found in Canada on the islands and mainland of the Pacific Coast of British Columbia as far north as the Gardner Canal, but not east of the Coast Mountains. It is adapted to many types of soils, but the best trees are found on those which are well-drained, have an abundance of moisture, and where the climate is quite humid. It grows in almost pure stands or as the principal species in mixtures of western hemlock, western red cedar, and the firs.



LEAVES—Needle-like, more or less flattened in cross-section, sharp-pointed, slightly narrowed at the base, flexible, soft, $\frac{3}{4}$ to $1\frac{1}{4}$ inches long; bright green and grooved above, paler below.

FLOWERS—Early spring; unisexual; male bright red, female tinged with red, green, both on the same tree.

FRUIT—Autumn; an oval, pendent cone, 2 to $4\frac{1}{2}$ inches long, the scales thin, rounded, stiff, much shorter than the rarely reflexed, conspicuous, 3-forked bracts; opening at maturity; falling soon afterwards.

TWIGS—Slender, hairy, orange-brown; buds conspicuous, sharp-pointed, about $\frac{1}{4}$ of an inch long, shiny, dark orange-red.

BARK—At first thin, smooth, grey-brown, becoming 10 to 12 inches thick, deeply furrowed into reddish-brown ridges.

WOOD—Moderately heavy and hard, very strong, usually straight-grained, non-porous; yellowish to reddish-brown with thick whitish or yellowish sapwood.

The Douglas fir is noted for the large dimensions of structural timber and clear lumber that may be obtained from it. It is an important wood for heavy and general construction, interior and exterior finish, veneer and plywood, railway ties, mine timbers, flooring, tanks, and poles and piling.

DOUGLAS FIR

LEAVES AND
OPENED CONE ▶



MATURE BARK ▲

TREES,
VANCOUVER, B.C. ▼



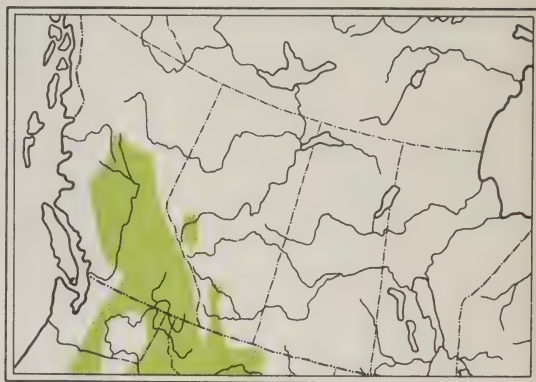
BLUE DOUGLAS FIR

Pseudotsuga taxifolia (Poir.) Britt.
var. *glauca* (Mayr) Sudw.

Rocky Mountain Douglas fir, Mountain Douglas fir.

The blue Douglas fir is the interior or Rocky Mountain form of the species. It is a large tree, attaining a height of 100 (rarely 130) feet and diameters of 2 to 3 feet. It develops a straight, slightly tapered trunk which in dense stands is usually clear of branches for $\frac{1}{3}$ or more of its length. The crown of numerous, slender, irregularly arranged branches is narrowly pyramidal in outline; it is narrower and more compact than that of the coast form.

In Canada this tree ranges throughout the southern interior of British Columbia north to Lake Babine and Lake Stewart. On the east slope of the Rocky Mountains in Alberta it grows as far north as the headwaters of the Athabaska River. Like the coast form it makes its best growth and is most abundant on deep, moist, well-drained soils. It forms pure stands or grows in mixture with western larch, ponderosa pine, lodgepole pine, western red cedar, and Engelmann spruce.



LEAVES—Needle-like, more or less flattened in cross-section, slightly narrowed at the base, pointed, $\frac{3}{4}$ to $1\frac{1}{4}$ inches long; bright blue-green and grooved above, paler below.

FLOWERS—Early spring; unisexual; male orange-red, female green, tinged with red, both on the same twig.

FRUIT—Autumn; an oval, pendent, reddish-brown cone, 2 to $3\frac{1}{2}$ inches long, the scales thin, rounded, stiff, much shorter than the commonly reflexed, 3-forked bracts; opening at maturity; falling soon afterwards.

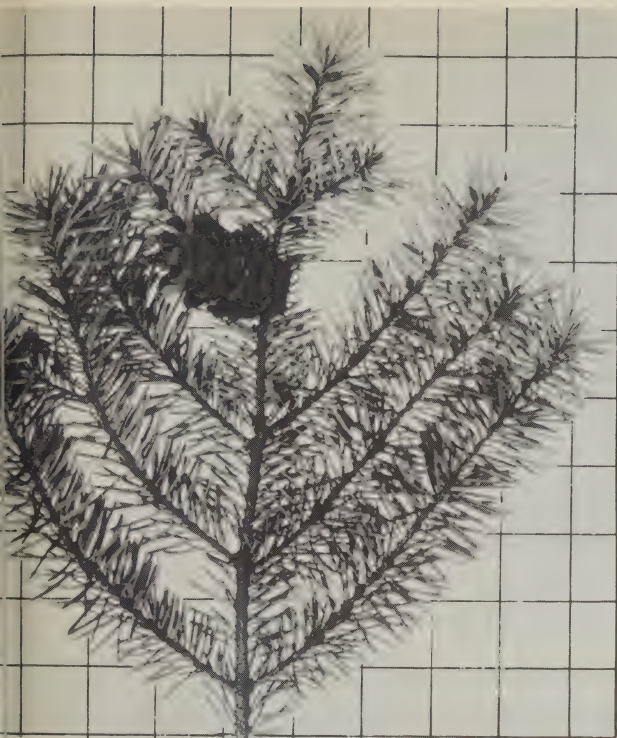
TWIGS—Slender, hairy, orange-brown; buds sharp-pointed, about $\frac{1}{4}$ inch long, shiny, brownish.

BARK—On young stems thin, smooth, greyish-brown, marked by resin blisters; becoming 4 to 6 inches thick, deeply furrowed into rough, reddish-brown ridges.

WOOD—Moderately light and strong, usually straight-grained, non-porous; yellowish to reddish-brown with narrow white or yellowish sapwood.

The wood is extensively used for lumber, poles, railroad ties, and general construction.

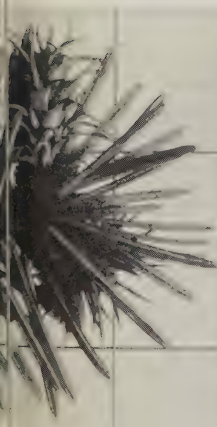
BLUE DOUGLAS FIR



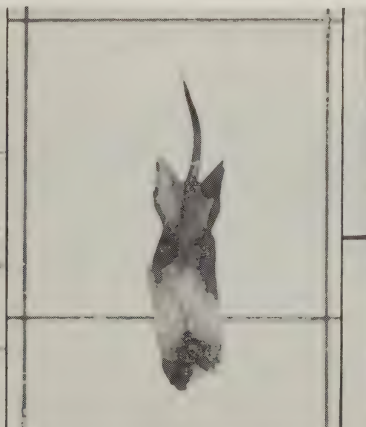
LEAVES, BUDS AND OPENED CONE



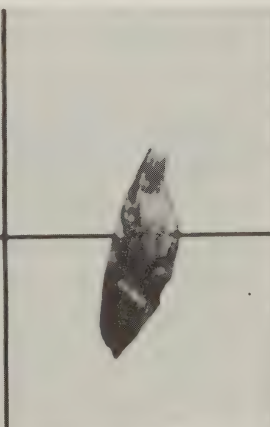
OPENED CONE



MALE FLOWER



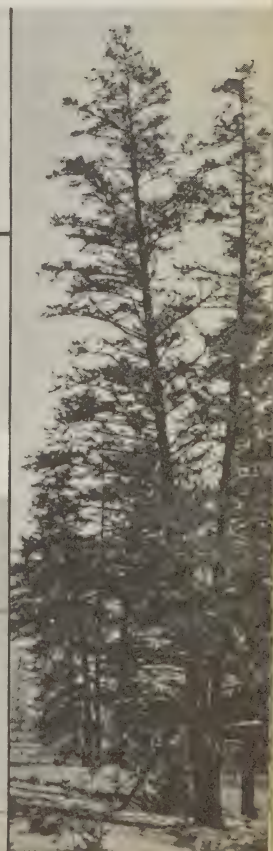
CONE BRACT



SEED, ENLARGED



MALE FLOWERS



DRY BELT TREES, B.C.

The FIRS *Abies* Mill.

The *Abies* or true firs are widely distributed in the temperate zone of the northern hemisphere. As a group they exhibit a preference for a cool and moist, but not extremely cold, climate. The genus includes about 40 species, of which 9 are native to North America. Four of these occur in Canada. Three, the grand, amabilis, and alpine firs are western species; the fourth, the balsam fir, is found from the Atlantic Coast to northern Alberta.

The firs, sometimes called the balsam or silver firs, are medium-sized to large evergreen trees with tall straight trunks and slender regularly whorled branches. The crowns are dense and spire-shaped. On open-grown trees the branches commonly extend to the ground. The bark on young trees is thin, smooth, and marked with conspicuous blister-like resin pockets. That on old trunks is thicker, often scaly, occasionally furrowed or plated, and the resin blisters are not so evident.

The leaves are needle-like and flattened in cross-section, have rounded or short-pointed tips, and are often notched at the apex. They are spirally arranged on the twigs, but often appear to be two-ranked, particularly on the lower branches. The twigs are smooth and, after the leaves are shed, marked with tiny, circular leaf scars.

The unisexual cone-like male and female flowers are borne separately on the same tree. They appear in the spring; the female on the upper side of the topmost branches, the male on the lower side of branches in the lower part of the crown. The fruit is an oblong or cylindrical woody cone, composed of thin fan-shaped scales, which stands erect on the branch. It matures in the autumn of the first growing season and then disintegrates, leaving the slender, spike-like cone axis still on the tree. No other native evergreen cone breaks up in this manner.

The firs are most easily separated from the other coniferous trees by the smooth twigs with circular leaf scars and the erect disintegrating cones. The wood of the 4 native species is quite similar and is put to much the same uses. They usually grow in stands intermixed with spruce and are commonly cut and sold with this wood, with no differentiation being made between the species when marketed as lumber. They provide excellent wood for pulp and are used extensively for that purpose.



FIR TOP HEAVILY LOADED
WITH MATURE CONES



YOUNG BALSAM FIR TREE,
GATINEAU PARK, QUE.



PURE STAND OF YOUNG BALSAM FIR, VALCARTIER, QUE.

BALSAM FIR

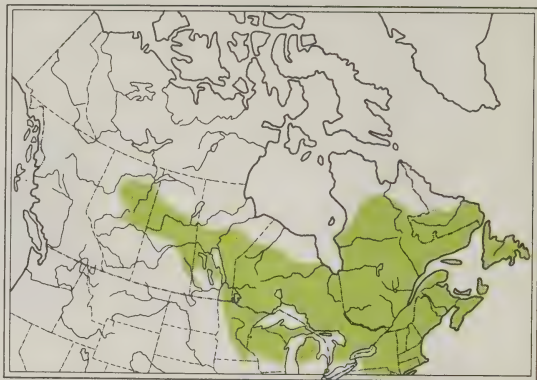
Abies balsamea (L.) Mill.

Fir, balsam, white fir, var, silver pine, white spruce, Canadian fir.

The balsam fir is one of the most distinctive and prolific species in Eastern and Central Canada. It is a medium-sized tree, usually 50 to 70 feet in height and 1 to 2 feet in diameter. The crown of slender, regularly-whorled branches is dense and spire-shaped. On young trees, and trees growing in the open, the branches extend down the trunk nearly to the ground. The bark on all but the oldest trees is very smooth and thin, and conspicuously marked with raised blisters containing an oily resin or balsam. On very old trees it may be broken into small irregular plates and the blisters are not as conspicuous. The root system is usually a shallow mat of spreading lateral roots. Only rarely is the tree more than moderately windfirm.

The balsam fir ranges from the Atlantic Coast of Canada westward and northward to northeastern Alberta. It is found in pure stands or mixed with red spruce in the East and with black and white spruce, tamarack, the aspens, and white birch throughout its range. It is adapted to a wide variety of sites, from cold swamps to high rocky mountainsides, but makes its best growth on moist well-drained loams.

A variety of this species, the bracted balsam fir (var. *phanerolepis* Fern.) is found in Newfoundland and eastern Quebec. It differs in having the tips of the bracts protruding slightly from between the cone scales.



LEAVES—Needle-like, flattened in cross-section, rounded or notched at the tip, usually appearing two-ranked, $\frac{3}{4}$ to $1\frac{1}{4}$ inches long; dark shiny green above, whitish below.

FLOWERS—May; unisexual; male yellowish to red, female purple, both sexes on the same tree.

FRUIT—October; an erect, oblong, dark purple cone, 2 to 4 inches long, the scales fan-shaped, usually slightly longer than broad, with short pointed bracts, disintegrating at maturity; seeds purplish.

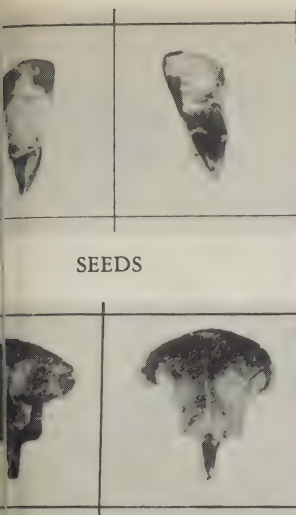
TWIGS—Slender, smooth, more or less hairy, yellow-green. Buds rounded, $\frac{1}{8}$ to $\frac{1}{4}$ of an inch long, orange-green.

BARK—On young stems smooth pale grey, with numerous prominent resin blisters; becoming roughened, somewhat scaly, red-brown; on very old trunks broken into small, irregular plates.

WOOD—Light, soft, not strong, somewhat brittle, non-porous; pale yellow to light reddish-brown.

The balsam fir, though slightly inferior in quality and strength to the spruces, is a valuable commercial species. The wood is used extensively for pulp and lumber, and as a rule is sold mixed with spruce.

BALSAM FIR



SEEDS

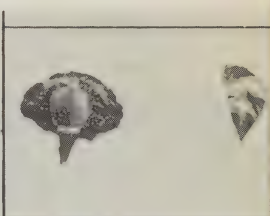
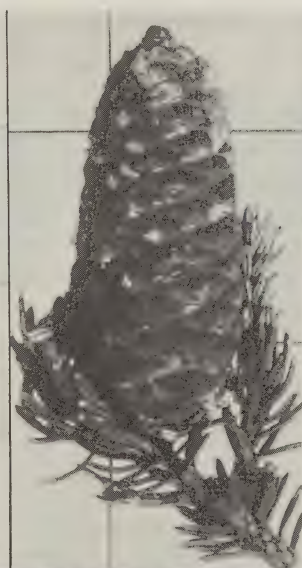


CONE SCALES

CONE AND LEAVES



LEAVES

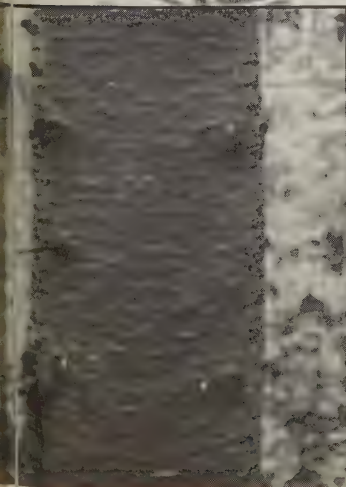


BRACED BALSAM FIR

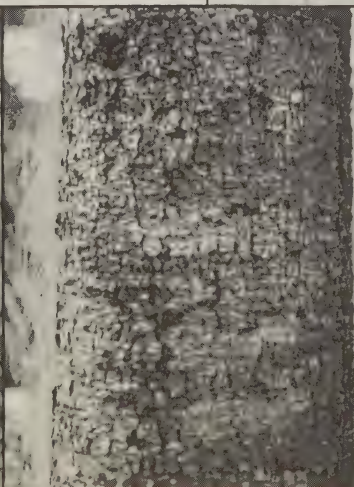
▲ CONE SCALE

▲ SEED

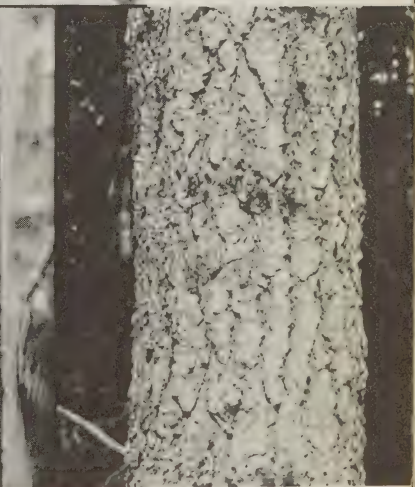
◀ CONE



YOUNG BARK



MATURE BARK



ROUGH BARK

THE FIRS

ALPINE FIR

Abies lasiocarpa (Hook.) Nutt.

Mountain fir, white balsam, white fir, western balsam fir, Caribou fir, Rocky Mountain fir.

The alpine fir at its best is a tree 65 to 100 feet high and 1 to 2½ feet in diameter, but on high, exposed slopes it is often reduced to a low, sprawling, or prostrate shrub. The crown is extremely narrow and spire-like. The branches are very short and form a thick growth. In the open they usually extend down the trunk to the ground.

It is, as the name denotes, a mountain species, and is found in British Columbia, Alberta, Yukon and Mackenzie at altitudes of 2,000 to 7,000 feet. It is not known on the Queen Charlotte Islands or in the southern coastal region. It makes its best growth on moist, well-drained, loam soils, although trees of a good size are often found on quite dry sites. In the interior, alpine fir is generally associated with Douglas fir, lodgepole pine, and Engelmann spruce at lower elevations and with the limber and whitebark pines at the timber-line. It is sometimes confused with the *amabilis* fir.



LEAVES—Needle-like, flattened in cross-section, seldom appearing 2-ranked, usually curved and twisted toward the upper side of the twig, tips notched except on some of the upper branches, 1 to 1¾ inches long; deep blue-green above and below.

FLOWERS—Spring; unisexual; the male dark indigo-blue, the female dark purple, both sexes on the same tree.

FRUIT—Autumn; an erect, cylindrical, dark purple cone, 2 to 4 inches long, the scales fan-shaped, mostly longer than broad, the bracts rounded, ending in long slender tips, disintegrating at maturity; seeds dark shiny purple.

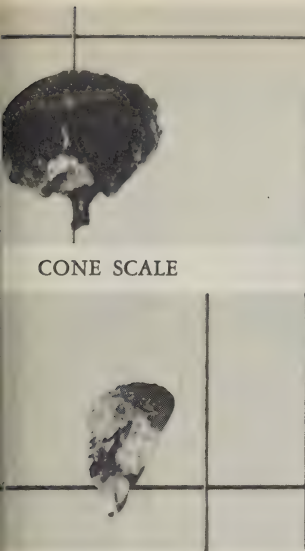
TWIGS—Stout, hairy, orange-brown, becoming smooth and grey. Buds rounded, 1/8 to 1/4 of an inch long, orange-brown.

BARK—On young stems, thin, smooth, grey, with conspicuous resin blisters; on old trunks 1 to 1½ inches thick, shallowly furrowed, roughened by reddish scales.

WOOD—Light, soft, not strong, non-porous; pale brown to almost white.

This is the only true fir in the Rocky Mountains, where it is often cut and sold with Engelmann and the white spruces. It is used chiefly for rough building purposes and mine timbers. It is also suitable for boxes and crates, and is valuable for pulpwood.

ALPINE FIR



CONE SCALE

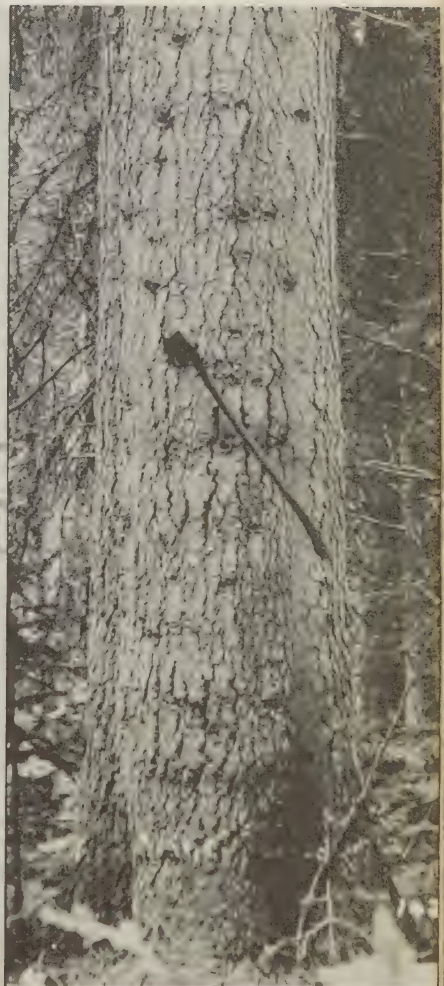
SEED



MATURE CONE



LEAVES



MATURE BARK

THE FIRS

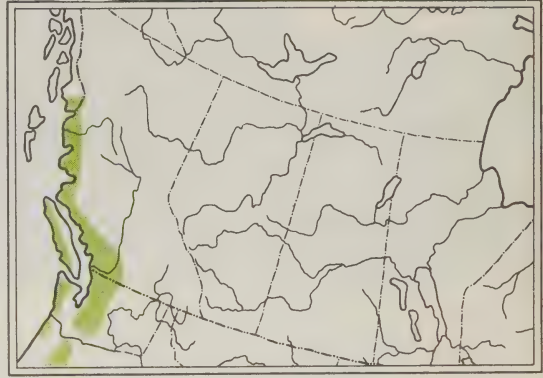
AMABILIS FIR

Abies amabilis (Dougl.) Forb.

Red fir, lovely fir, alpine fir, larch, silver fir,
white fir, balsam fir, Cascade fir.

The amabilis fir is one of the 2 firs found on the west coast, but it extends considerably farther north than the grand fir. It is a medium-sized tree 80 to 100 (occasionally 125) feet in height and 1½ to 3 feet in diameter. The trunk is straight and in dense stands is clear for much of its length. Trees growing in the open develop wide, conical crowns of dense branches which extend to the ground. The lower branches droop markedly. The thin grey bark, unbroken except on very old trunks and then only at the base, is a distinctive characteristic. It is conspicuously marked with large, white blotches.

This fir extends from Alaska southward through the whole length of the coastal region of British Columbia, but is mostly confined to the western slope of the Coast Range and to Vancouver Island. It is not known on the Queen Charlotte Islands. It is found on the lower slopes, benches, and flats, growing on well-drained, gravelly sand, or sandy loams. Occasionally it is found in pure stands but more often is mixed with Douglas fir, western hemlock and western white pine.



LEAVES—Needle-like, flattened in cross-section, usually notched at the tip, grooved above, not always appearing 2-ranked, $\frac{3}{4}$ to $1\frac{1}{4}$ inches long; dark shiny green, with 2 broad white bands below.

FLOWERS—Spring; unisexual; the male bright red, the female dark purple, both sexes on the same tree.

FRUIT—September, an erect, dark purple, cylindrical cone, $3\frac{1}{2}$ to 5 inches long; the scales nearly as broad as long, with rounded bracts narrowed into long, thin tips, disintegrating in October; seeds yellowish-brown.

TWIGS—Stout, minutely hairy, orange-brown to reddish-brown. Buds dark purple, shiny, nearly round, resinous, $\frac{1}{8}$ to $\frac{1}{4}$ of an inch in diameter.

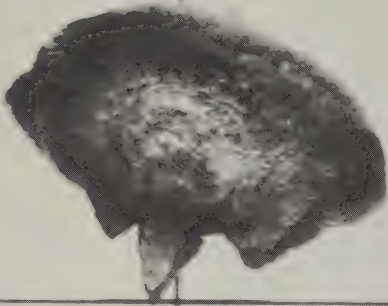
BARK—Thin, smooth, unbroken except on very old trees, pale or ash-grey with conspicuous white patches.

WOOD—Light, soft, not strong non-porous; light yellowish-brown.

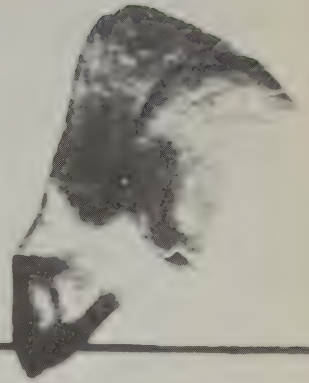
The wood is similar to that of the other true firs. It is used for pulp and lumber. The tree is sometimes planted for decorative purposes.



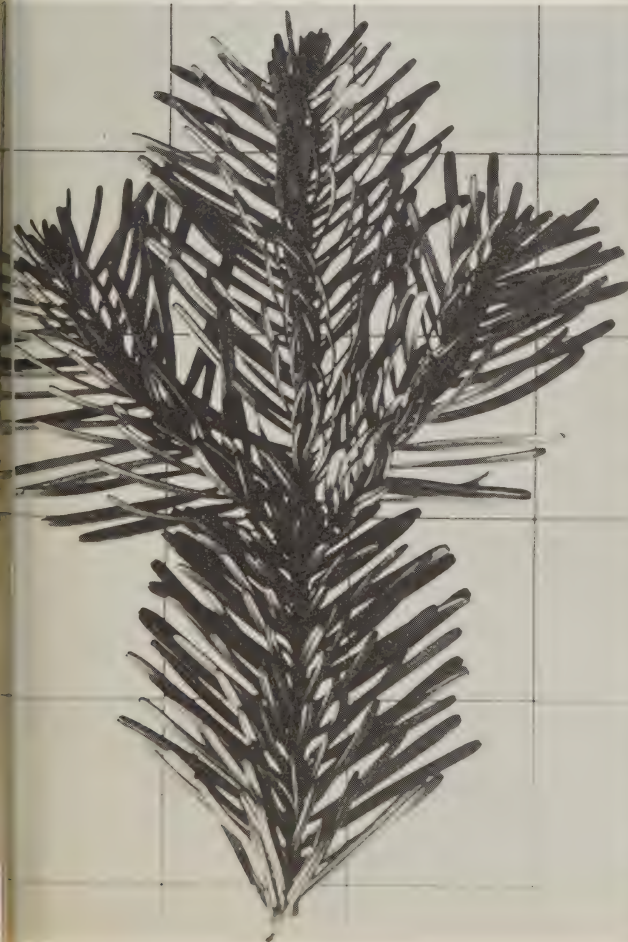
CONE



CONE SCALE



SEED



LEAVES



MATURE BARK

THE FIRS

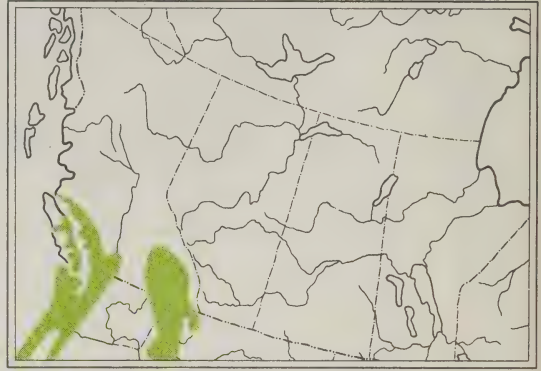
GRAND FIR

Abies grandis (Dougl.) Lindl.

Lowland fir, white fir, western balsam, silver fir, larch, giant fir, lowland white fir.

The grand fir is the largest of the Canadian firs, attaining heights of 100 to 125 feet and diameters of 2 to 3 feet. The trunk is tall, straight, and clear, except when growing in the open. The crown is narrow and spire-shaped in young trees, but with age becomes rounded and dome-like, also the lower branches have a tendency to droop and this makes the crown appear wider in the middle than at the base. The bark is rather thick, for a fir, and is often cut by narrow furrows into hard, sharp, horny ridges.

The range of the grand fir is rather limited, and in Canada it is found only in the southern coastal region and in the interior wet belt of British Columbia. It prefers deep, moist, but well-drained alluvial soils, and is found chiefly along streams and on lower slopes. It is seldom found in pure stands, being usually mixed with Douglas fir, western red cedar, western hemlock, and black cottonwood.



LEAVES—Needle-like, flattened or occasionally 4-sided in cross-section, appearing distinctly 2-ranked on lower branches, $1\frac{1}{4}$ to $2\frac{1}{4}$ inches long, blunt, grooved above; dark yellow-green above, conspicuously whitish below.

FLOWERS—Spring; unisexual; the male yellow, the female yellow-green, both sexes on the same tree.

FRUIT—Early September; an erect, cylindrical, yellow-green cone, 2 to $4\frac{1}{2}$ inches long, the scales much broader than long, the bracts squarish with short, spike-like tips; seeds yellowish-brown; disintegrating at maturity.

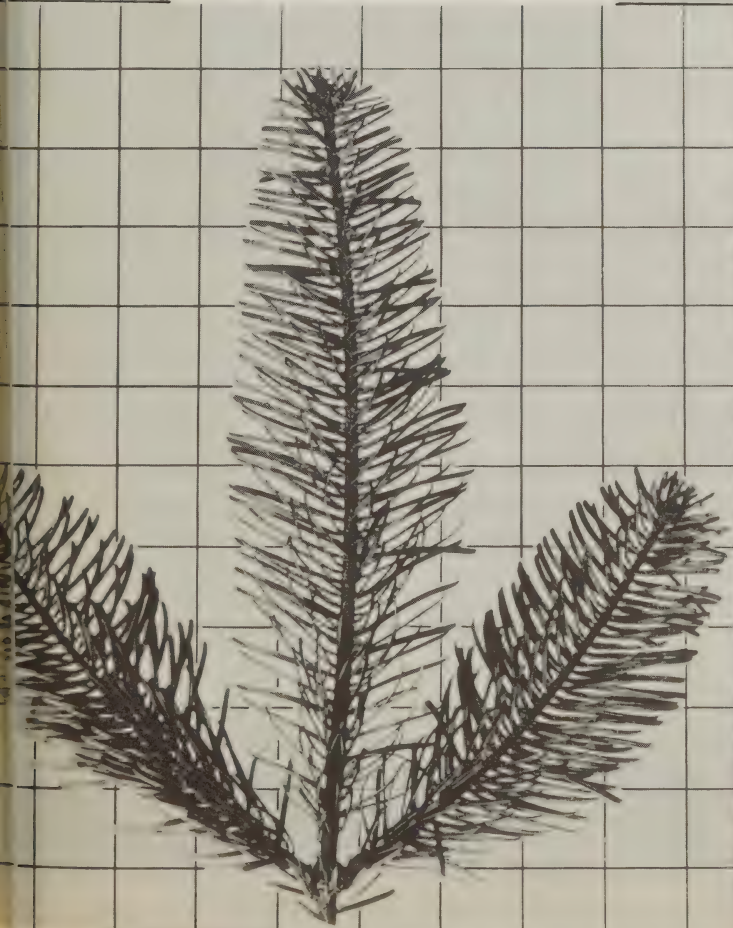
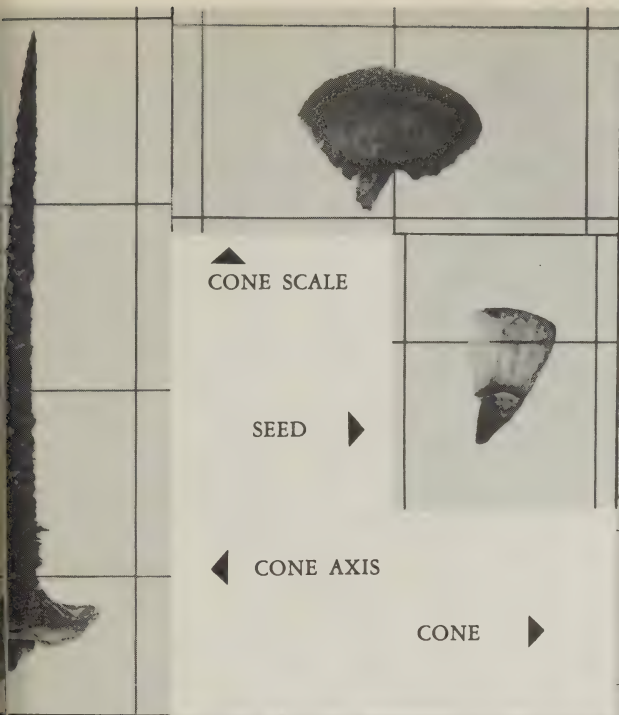
TWIGS—Slender, hairy at first, yellow-green to orange-brown. Buds blunt, $\frac{1}{8}$ to $\frac{1}{4}$ of an inch long.

BARK—On young stems thin, grey-brown, with conspicuous resin blisters and chalky-white patches; becoming 2 to 3 inches thick, usually furrowed into hard, reddish-brown ridges.

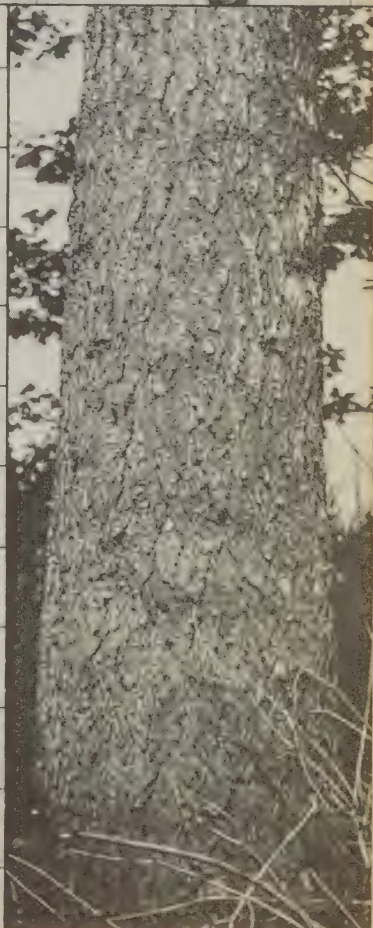
WOOD—Light, soft, not strong, fine-textured, non-porous; pale yellow to light brown.

This tree is not of great commercial importance in Canada. It is used for lumber, box and crate material, and pulpwood.

GRAND FIR



LEAVES



MATURE BARK

The ARBOR-VITAE *Thuja* L.

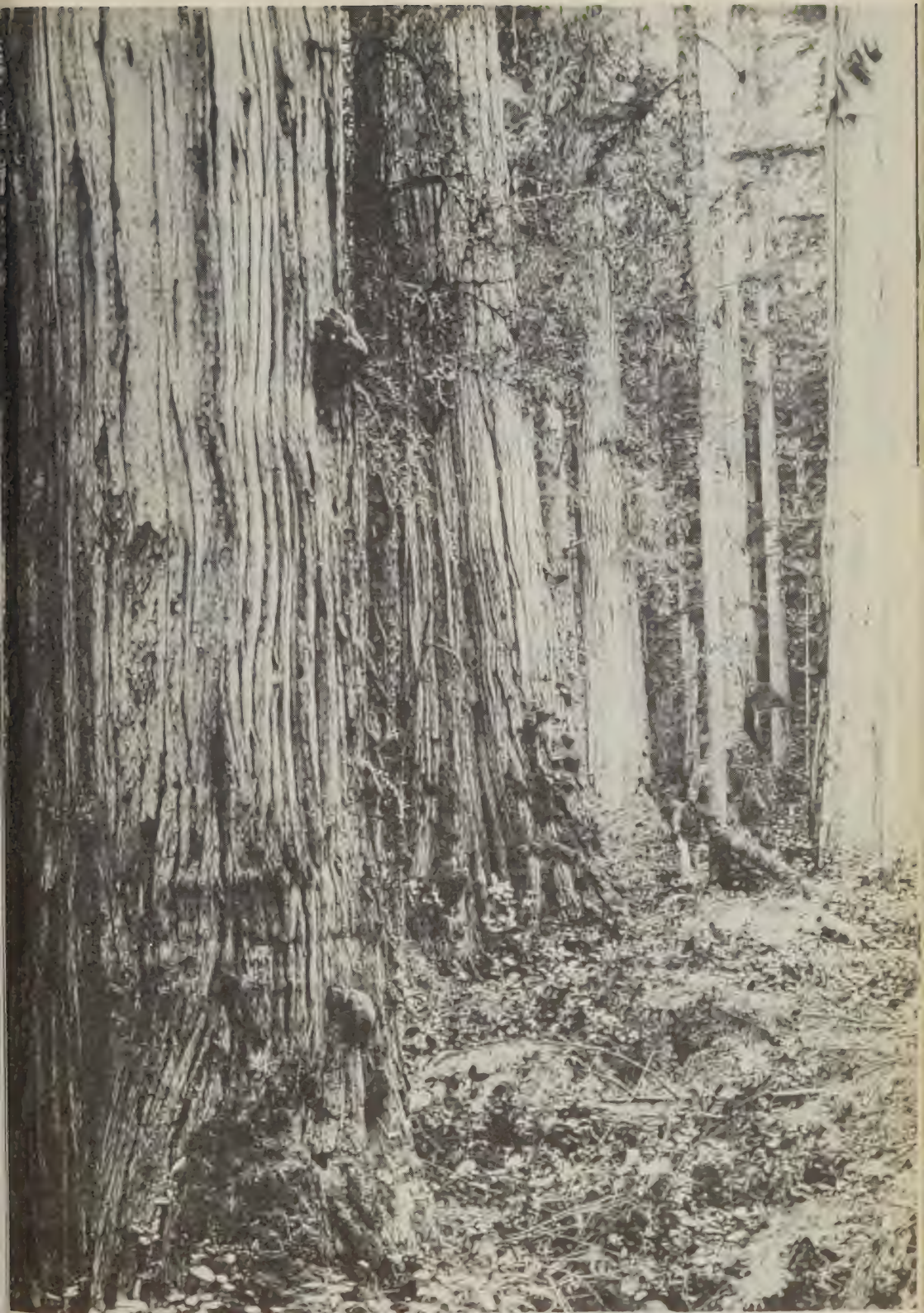
There are 5 or 6 known species of arbor-vitae, of which 2 are native to Canada and the United States. The others are native to China, Japan, and Korea, but are occasionally planted in this country for decorative purposes. One of the Canadian species, the eastern white cedar, or white arbor-vitae, is distributed from Nova Scotia to Manitoba; the second, the western red cedar, or giant arbor-vitae, is found in Canada only in southern British Columbia. The arbor-vitae are commonly called cedars, but the true cedars belong to the genus *Cedrus* Trew and none are native to North America.

The arbor-vitae are medium to very large evergreen trees with short spreading or drooping branches and thin fibrous bark. The branchlets and twigs are flattened in cross-section and are arranged in flat, usually drooping sprays. The small evergreen aromatic leaves are of two sorts. On seedling plants and to a lesser extent on vigorous leading shoots they are somewhat lance-shaped, sharp-pointed, and diverge from the twig. On older trees they are scale-like, rounded at the tips, overlap like shingles on a roof, and occur in pairs pressed closely against the twig. Each pair is placed at right angles to the pair immediately above and below it. During the second or third growing season many of the lateral branchlets turn brown and fall off with the leaves still attached.

The tiny, inconspicuous, cone-like, unisexual flowers appear in the spring, usually on different branches of the same tree. They are borne singly on the tips of the twigs. The fruit is an erect semi-woody cone composed of 8 to 12 thin scales. It matures at the end of the first growing season, opening soon afterwards to release the seeds. These are about $\frac{1}{2}$ of an inch long and in the native species have 2 thin, gauze-like wings. Only the middle cone-scales bear seed.

The wood is very light and soft, non-porous, highly aromatic, and moderately to strongly resistant to decay. It is especially valuable in conditions favourable to decay, except where great strength and resistance to mechanical wear are of prime importance.

The arbor-vitae might be mistaken for species of *Chamaecyparis* Spach or *Juniperus* L. at first sight, but a comparison will show their leaves to be less sharp and as a rule more closely pressed against the twigs. Those of the yellow cedar in particular have sharp spreading points which make the sprays harsh and prickly to the touch.



WESTERN RED CEDAR GROWING AT CREASY BAY, B.C.

EASTERN WHITE CEDAR

Thuja occidentalis L.

Cedar, white arbor-vitae, northern white cedar, eastern cedar, American arbor-vitae.

The eastern white cedar is a small tree averaging about 45 feet in height and 1 foot in diameter, but sometimes reaching a height of 80 feet and a diameter of 3 feet. The trunk is much tapered and often twisted. The crown is conical, dense, long, and narrow. When grown in the open the tree often has a trim artificial appearance, almost as if it had been pruned. The root system is usually shallow.

It is found in western Nova Scotia and western Prince Edward Island throughout New Brunswick and western Quebec to the south end of James Bay, and across southern and central Ontario to the south end of Lake Winnipeg in Manitoba. It also occurs in isolated patches on the west side of Hudson Bay and near the north ends of Lakes Winnipeg and Winnipegosis.

Eastern white cedar commonly occurs in swamps, around springs and lakes, or on similar wet sites, but it will also thrive on the thin, often dry, soil of limestone ridges. It grows in pure stands of considerable size, or in mixtures of spruce, balsam fir, tamarack, black ash, speckled alder, and white elm.



LEAVES—Scale-like, pointed, $\frac{1}{8}$ to $\frac{1}{4}$ of an inch long, dark yellow-green, overlapping, in pairs pressed closely to the twig, each pair at right angles to the pair below.

FLOWERS—April-May; unisexual; tiny cone-like bodies, the male yellowish, the female pinkish at pollination; both sexes terminal on different twigs of the same tree.

FRUIT—Late summer; an oblong erect cone, $\frac{1}{3}$ to $\frac{3}{4}$ of an inch long, composed of 4 to 6 pairs of thin brown scales, containing the small winged seeds; opening at maturity, but persisting on the tree over winter.

TWIGS—Slender, flattened, arranged in flat, fan-shaped sprays. Buds minute, without scales, protected by the leaves.

BARK—Thin, reddish-brown, shreddy, forming a network of narrow ridges and shallow furrows on old trunks.

WOOD—Very light, soft, not strong, brittle, non-porous, fragrant; light brown with nearly white sapwood.

The wood of this species is the lightest in weight of Canadian timbers, and is one of the most resistant to decay. It is particularly valuable for poles, posts, shingles, canoes, and boat-building, and, in fact, in any situation where timber is exposed to decay without great mechanical wear.

EASTERN WHITE CEDAR



OPENED CONES



MATURE BARK



YOUNG GROWN TREE, ARBORETUM
EXPERIMENTAL FARM, OTTAWA



LEAVES AND CLOSED CONES

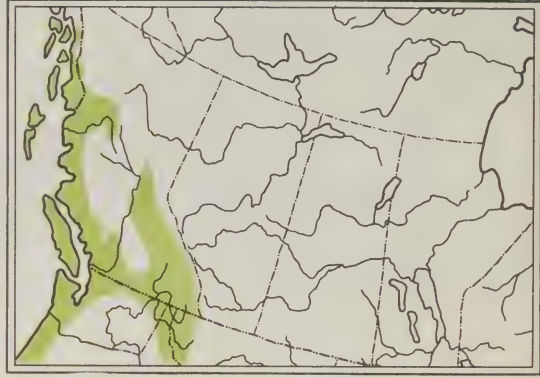
WESTERN RED CEDAR

Thuja plicata Donn

Giant arbor-vitae, red cedar, British Columbia cedar, British Columbia red cedar, giant cedar, western cedar.

The western red cedar is one of the largest trees in the Pacific region, frequently reaching heights of 150 to 200 feet and diameters of 8 feet or more. It is also one of the oldest, trees of 800 years of age having been logged. The trunk is much tapered and broadly buttressed at the base. It is supported by a strong but shallow and wide-spreading root system. The crown of spreading or drooping branches is long, narrow, and conical in youth, becoming shorter, wider, and irregular with increased age.

In Canada this tree is confined to British Columbia, being found on the Pacific Coast as far north as Alaska and in the valleys of the interior wet belt. It prefers a deep, moist, porous soil on cool slopes and in gulches. Occasionally it is found on a fairly dry site, but in such circumstances its growth is stunted. It grows singly or in scattered patches; never in pure stands of any size. In the north it associates with Sitka spruce and yellow cedar and farther south with western hemlock and Douglas fir.



LEAVES—Scale-like, blunt, $\frac{1}{8}$ to $\frac{1}{4}$ of an inch long, shiny, dark yellow-green, overlapping in pairs pressed to opposite sides of the twig, each pair at right angles to the pair below.

FLOWERS—April-May; unisexual; tiny cone-like bodies, about $\frac{1}{12}$ of an inch long, the male yellowish, the female pinkish at pollination, both sexes terminal on different twigs of the same tree.

FRUIT—August-September; an erect oval cone, about $\frac{1}{2}$ -inch long, composed of 4 to 6 pairs of thin brown, frequently spine-tipped, scales, containing the small winged seeds; opening at maturity, but persisting on the tree over winter.

TWIGS—Slender, flattened; buds minute, without scales, inconspicuous.

BARK—Thin, stringy, fibrous; cinnamon red on young stems; grey, forming a network of narrow intersecting ridges, on older trunks.

WOOD—Very light and soft, brittle, fragrant, straight-grained, non-porous; reddish to pinkish-brown with nearly white sapwood.

This tree is one of the important timber producers of British Columbia. The wood is very light in weight and is suitable for all uses in conditions favourable to decay. It is especially prized for poles, posts, shingles, and house-siding.



SCALE-LIKE LEAVES AND OPENED CONES

77

THE CHAMAECYPARIS

YELLOW CEDAR

Chamaecyparis nootkatensis (D. Don) Spach

**Yellow cypress, Alaska cypress, Alaska cedar,
Nootka cypress, canoe cedar.**

The yellow cedar is a moderately large tree, usually about 80 feet tall and 2 to 3 feet in diameter, although sometimes over 100 feet in height and 4 to 5 feet in diameter. The trunk is very much tapered. The crown is conical and narrow and has slightly drooping or horizontal branches. The tip of the tree is very slender and often bent over. The root system is usually shallow.

This tree is confined to the Pacific Coast, and in Canada is found from Alaska southward along the west slope of the Coast Range and on the adjacent islands. In the south it is not known at altitudes below 400 feet and its range extends up to 5,000 feet. Toward the north it gradually descends until it reaches sea-level at Knight Inlet. It is usually associated with amabilis fir and western hemlock, replacing western red cedar where growing conditions become more difficult. It seldom occurs in pure stands; usually it is scattered or in patches. On high exposed ridges it is a shrub sprawling over the ground.

. . .

Six species of *Chamaecyparis* Spach are known, 3 in East Asia and 3 on this continent. Only the one described above occurs in Canada.



LEAVES—On seedlings, awl-shaped, sharp-pointed, arranged in groups of 3 or 4 on older trees, scale-like, bluish-green, sharp-pointed, prickly to the touch, about $\frac{1}{8}$ of an inch long; overlapping in pairs on opposite sides of the twig, each pair at right angles to the pair below.

FLOWERS—Early spring; unisexual; small inconspicuous bodies, the male yellow, female reddish, on different branches of the same tree.

FRUIT—Autumn, an erect spherical red-brown cone, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter, the seeds about $\frac{1}{4}$ of an inch long, broadly two-winged; opening at maturity, falling during the winter.

TWIGS—Slender, flattened, arranged in flat, drooping sprays; buds without scales.

BARK—Thin, greyish-brown, scaly on young stems, forming narrow flattened intersecting ridges on older trunks.

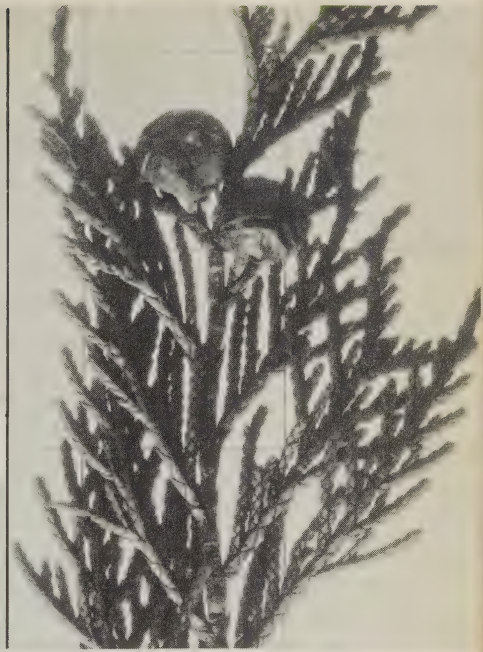
WOOD—Relatively light, hard, close-grained, non-porous; pale yellow with thin nearly white sapwood.

Yellow cedar is useful for poles, piling and boat-building, and generally for use under conditions favouring decay. It is one of the best woods for battery separators.

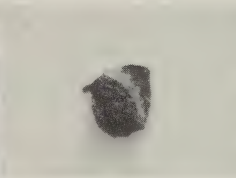
YELLOW CEDAR



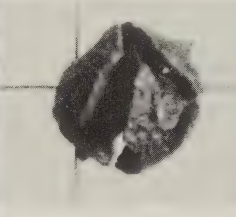
LEAVES



LEAVES AND CONES



SEED, TWICE
ACTUAL SIZE



OPENED CONE



MATURE BARK



TREE, BRITISH COLUMBIA

The JUNIPERS *Juniperus* L.

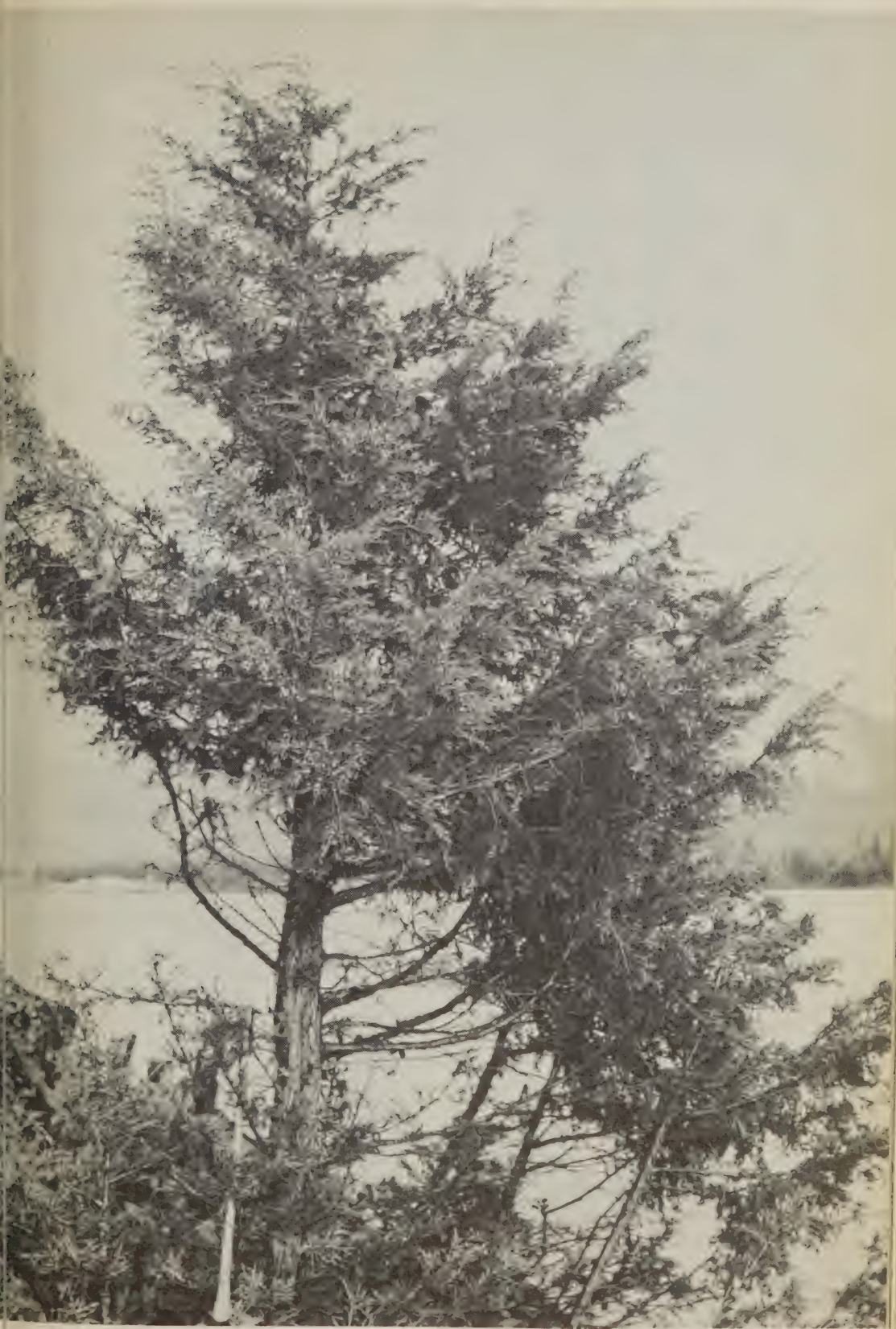
The 40 or more known species of juniper are widely distributed over the northern hemisphere and range in size from low creeping shrubs to medium-sized trees. The majority are of little commercial importance because of their small size and irregular trunks. About 15 species are found in North America, of which 4 are native to Canada

Only 2 of the Canadian junipers reach tree size. One of these, the Rocky Mountain juniper, is confined to the mountainous region of the West; the second, the red juniper, is found in the southern parts of Ontario and Quebec. The other two species, the dwarf or common juniper, *Juniperus communis* L., and the creeping juniper, *Juniperus horizontalis* Moench, are more widely distributed, being found across Canada from coast to coast. They are ordinarily distinguished by their low creeping habit of growth and radiating branches.

The junipers are evergreen trees with compact, more or less pyramidal, crowns and thin shreddy bark. The small twigs and branchlets are usually four-sided in cross-section, and are irregularly arranged on the branches. The leaves are of two kinds: on seedling plants and vigorous leading shoots they are narrowly awl-shaped, very sharp-pointed, and are arranged in pairs and opposite, or in threes, with the tips spreading widely from the twig; the other form, which is more typical for the tree species, is a tiny scale-like leaf. These leaves are pressed closely to the twig and are borne opposite one another in overlapping pairs, each pair set at right angles to the pair immediately above and below it. They may be sharp or blunt, and often have a minute glandular dot or pit on the back which is missing in the awl-shaped form.

The minute, unisexual flowers are borne as a rule on different trees. An occasional tree may bear both male and female flowers. They appear in the spring as inconspicuous cone-like bodies, solitary or in clusters on the tips of the branches. The fruit is a fleshy, dark blue, bloom-covered, berry-like cone the size of a pea, which has a peculiar sweet resinous taste. It requires one, or in some species two or three seasons to reach maturity. These "berries" are borne in large numbers on vigorous shoots of the female tree and usually remain on the tree all winter.

Juniper wood is relatively soft, fine-textured, easy to work, very durable, and has a pleasing fragrance. It is in considerable demand for the lining of closets and moth-proof chests, and for lead pencils, cigar boxes, and various kinds of woodenware. It seldom reaches sawlog size in Canada and therefore is used mostly "in the round" for fence-posts and small poles. Cedar oil is distilled from the leaves and branches. All the junipers are popular for ornamental planting and numerous horticultural forms have been developed by nurserymen and plant breeders.



ROCKY MOUNTAIN JUNIPER, BRITISH COLUMBIA

THE JUNIPERS

RED JUNIPER

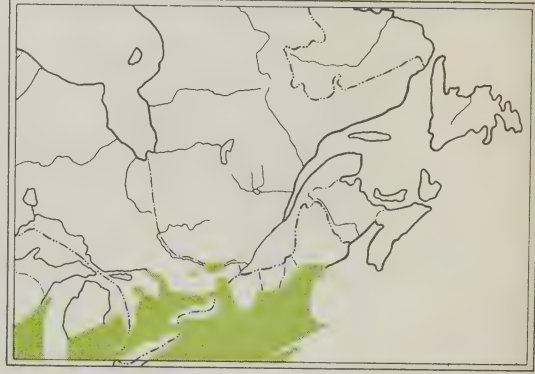
Juniperus virginiana L.

Juniper, red cedar, pencil cedar, pencil juniper, eastern redcedar (U.S.).

The red juniper in Canada is a small, slow-growing tree commonly 25 to 30 feet in height and 7 or 8 inches in diameter. It is often little better than a low shrub in exposed situations. When young it has a narrow, compact, and pyramidal crown which becomes open and irregular as the tree grows older. The trunk is very irregular in cross-section and tapers rapidly in young trees. The branches are short and slender, horizontally spreading below and ascending above. In the open, the lower branches often extend to the ground. Except on shallow sites, the roots extend well below the surface.

This tree is found in southern Ontario along the St. Lawrence and Ottawa Rivers westward to Georgian Bay on Lake Huron. It has also been reported, but without verification, from the Maritime Provinces and southern Quebec. It will grow on a variety of sites, but prefers a light loam of limestone origin. It occurs singly or in small patches, along fences, and on old pastures, abandoned farmland, dry slopes, and rocky ridges.

Red juniper is easily distinguished from any other similar tree found within its Canadian range by the blue, berry-like fruit.



LEAVES—Dark green; on young trees and sometimes on leading shoots, awl-shaped, sharp-pointed, about $\frac{1}{2}$ inch long, occurring in pairs or in threes, spreading from the twig; on older trees, scale-like, pointed, about $\frac{1}{8}$ of an inch long, overlapping in pairs pressed closely against the twig, each pair at right angles to the pair above and below it.

FLOWERS—April-May; unisexual; minute, cone-like bodies, the male and female usually on different trees.

FRUIT—Autumn of the first year; a fleshy, sweetish, aromatic, blue, berry-like cone, $\frac{1}{4}$ to $\frac{1}{3}$ of an inch in diameter, containing one or several hard bony seeds; remaining on the tree over winter.

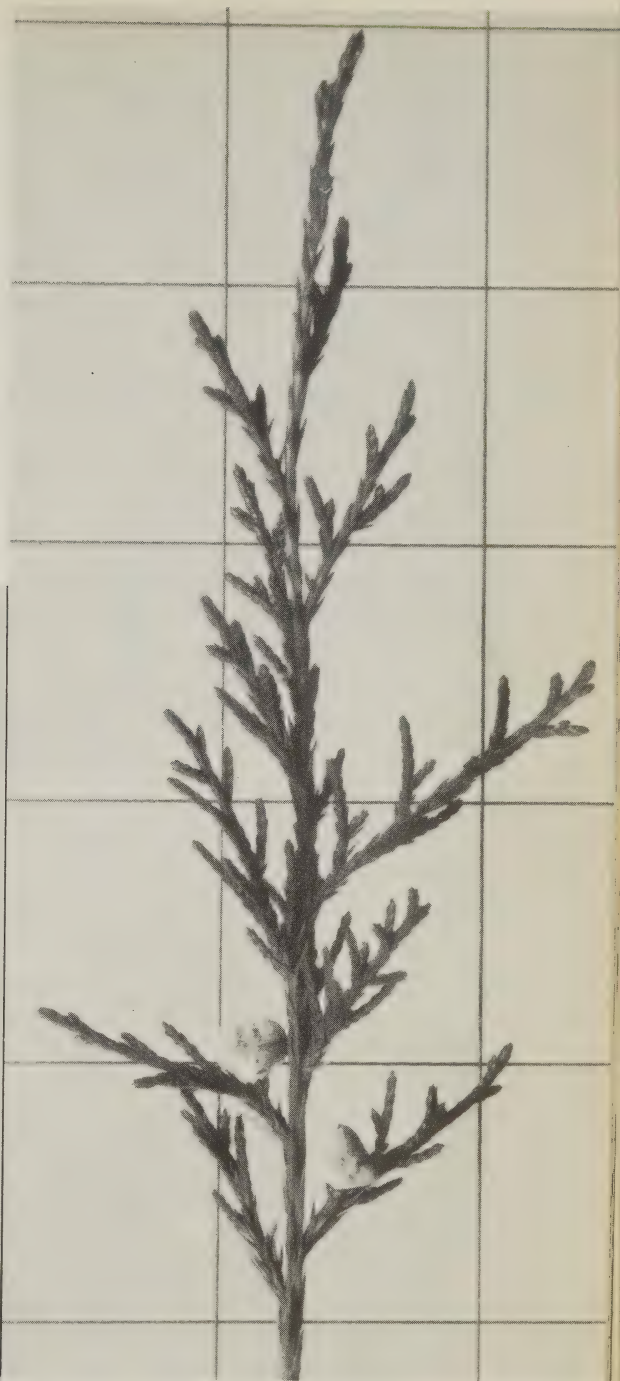
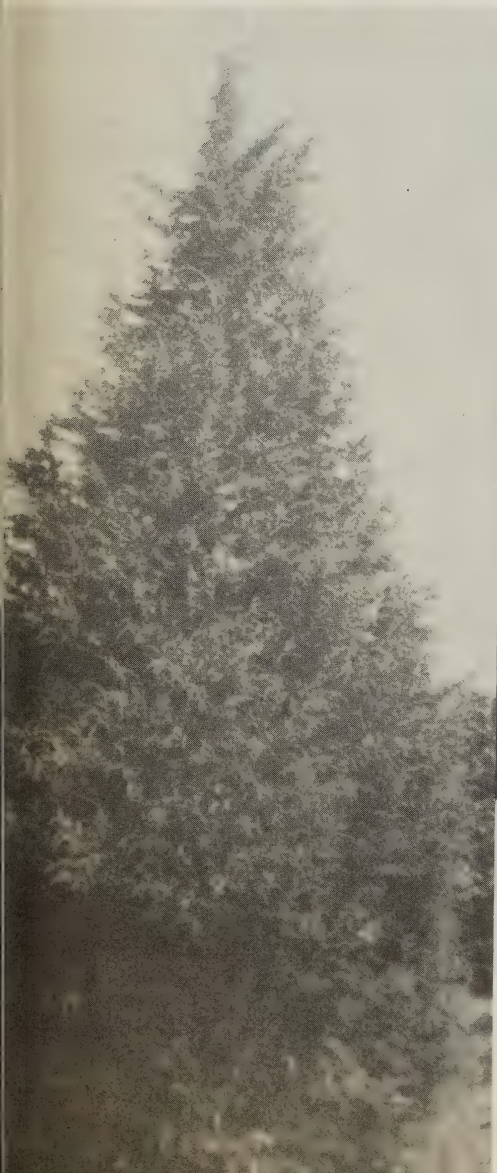
TWIGS—Slender, 4-sided, red-brown; winter buds minute, without scales, inconspicuous.

BARK—Thin, fibrous, reddish-brown, separating into shreddy strips.

WOOD—Medium light and soft, not strong, aromatic, fine-textured, non-porous; rose-red with almost white sapwood.

This species was formerly the most important source of pencil stock, but owing to its scarcity is now seldom used for this purpose. Though often of small dimensions and knotty, it is valuable for moth-proof chests and wardrobes. It is durable in contact with the soil and when available is used locally for fence-posts.

LEAVES
AND
BERRY-LIKE
FRUIT



OPEN-GROWN TREE,
NEAR ELGIN, ONT.



ROCKY MOUNTAIN JUNIPER

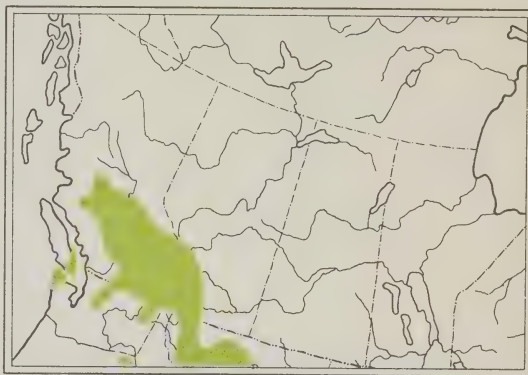
Juniperus scopulorum Sarg.

Rocky Mountain red cedar,
red cedar, western juniper.

The Rocky Mountain juniper is a small bushy tree, ordinarily 10 to 20 feet in height, sometimes in favourable sheltered sites reaching a height of 30 feet, and a diameter of 12 inches. On high exposed mountain slopes it is reduced to a low, sprawling shrub. The trunk is short, stout and often divided near the ground. The crown is typically irregular and rounded. On exposed sites the branches are long, stout and somewhat ascending; on protected sites, slender and usually drooping.

It is found in the foothills and mountains of southern Alberta and westward throughout southern British Columbia, generally at high altitudes. It is commonly found on dry rocky or sandy soils, but makes its best growth in rather moist canyon bottoms. It grows in pure stands or associated with Douglas fir and ponderosa pine.

In appearance this tree resembles very much the red juniper of Eastern Canada, and it was at one time thought to be a form of that tree. It differs from it chiefly in the fact that the berries require 2 years to reach maturity, while those of the red juniper require but one. It can be distinguished from any other western tree with which it might be confused by the blue berry-like fruit.



LEAVES—Pale to dark green; on young trees and sometimes on leading shoots, awl-shaped, sharp-pointed, about $\frac{1}{2}$ inch long, borne in pairs or in threes, spreading away from the twig; on older trees, scale-like, pointed, about $\frac{1}{8}$ of an inch long, overlapping in pairs, pressed closely to the twig, each pair at right angles to the pair immediately above and below it.

FLOWERS—Spring; unisexual; minute, inconspicuous, cone-like bodies, the male and female on different trees.

FRUIT—Autumn of the second year; a sweetish, aromatic, blue, berry-like cone, $\frac{1}{4}$ to $\frac{1}{3}$ of an inch in diameter, containing usually 2, sometimes 1, hard bony seeds; remaining on the tree over winter.

TWIGS—Slender, 4-sided in cross-section; the buds minute, without scales.

BARK—Thin, fibrous, red-brown to grey-brown, divided by shallow furrows into flat, interlacing ridges.

WOOD—Light, soft, not strong, non-porous; bright or dull red streaked with white, with thick white sapwood.

This tree is too rare to be of any commercial importance in Canada. It is suitable for ornamental planting on dry sites and is useful in preventing erosion on high slopes.



LEAVES AND FRUIT



BALSAM POPLAR AND WHITE BIRCH



SUGAR MAPLE, RED MAPLE, WHITE ELM AND BASSWOOD

PART II

BROAD-LEAVED TREES

This part deals with the broad-leaved (mostly deciduous) species commonly referred to as the hardwoods. The only broad-leaved evergreen tree in Canada is the arbutus of the Pacific Coast.

The POPLARS *Populus* L.

The poplars are widely distributed throughout the northern hemisphere, chiefly in the temperate zone. About 35 species are recognized, 8 of which are native to Canada. Some of these are more commonly known as cottonwood or aspen. They are:—

Trembling aspen	Black cottonwood
Largetooth aspen	Lanceleaf cottonwood
Balsam poplar	Narrowleaf cottonwood
Eastern cottonwood	Plains cottonwood

The poplars are deciduous, medium to large, fast-growing, moisture-loving trees. In many sections of the prairie region they are often the only species attaining tree size. Many of the species propagate chiefly by means of suckers that spring up from the roots and a few of them sprout readily from the stump. Nursery propagation of these trees is chiefly carried on by planting cuttings taken from the roots, twigs, and smaller branches.

The leaves are usually a reliable means of identifying the various species. They are alternate, simple, more or less coarsely toothed, and turn a clear yellow in the autumn before falling. The unisexual male and female flowers are nearly always borne on different trees on twigs of the previous season's growth. Both are arranged in conspicuous, drooping catkins which appear from special flower buds before the leaves in the early spring. The fruit, a small capsule, matures by the time the leaves are fully grown and splits open at once, releasing the minute seeds, each with a tuft of white hairs. They are so light that they are easily carried long distances by the wind.

The poplars are related to the willows and the 2 genera have many characteristics in common. Even the leaves of some species resemble those of the willows. They are readily distinguishable from these trees, however, by their winter buds. The buds of the poplars have many scales and those of the willows have but one. Poplar twigs bear a terminal bud, the laterals and the terminal being nearly the same size. Those of some species are often quite sticky with resin. The pith of the twigs and young branchlets is distinctly star-shaped in cross-section. The bark on young poplar trees is generally whitish and smooth; on older trees it tends to become greyish, rough, and more or less furrowed.

Several exotic poplars, such as the familiar white or silver poplar, *Populus alba* L., and its variety *nivea* Ait. distinguished by a dense, white covering of down on the lower surface of the leaves, and the tall, erect Lombardy poplar, *Populus nigra* L. var. *italica* Muench., have been widely planted for decorative purposes in Canada and are now found all through the older settled portion of the East. The Carolina poplar, *Populus eugenei* Simon-Louis, is also popular for ornamental planting. The Lombardy and Carolina poplars are hybrid clones, each derived from a single seedling and propagated exclusively by means of cuttings.



MIXED TREMBLING ASPEN AND LARGETOOTH ASPEN
PETAWAWA FOREST EXPERIMENT STATION, CHALK RIVER, ONT.

THE POPLARS

TREMBLING ASPEN

Populus tremuloides Michx.

Poplar, asp, quaking asp, aspen poplar, white poplar, popple, smooth-barked poplar.

The trembling aspen is not a very large tree, averaging about 40 feet in height and 8 to 10 inches in diameter, but sometimes reaching a height of 90 feet and a diameter of 2 feet. The trunk is slender, has a gradual taper, and extends almost to the top of the tree. The tree is supported by a shallow system of widely spread lateral roots. Often the overlapping roots of nearby trees become grafted together. The crown of moderately stout, usually ascending branches is round-topped and open.

It is a tree of very wide distribution, extending completely across Canada from the Atlantic Coast and Hudson Bay to the mouth of the Mackenzie River and Alaska. It grows best on a well-drained loam, but is commonly found on a wide variety of soils. It is very intolerant of dense shade, and occurs most frequently in pure stands or mixed with other light-demanding species such as the white birch, pin cherry, balsam poplar, and largetooth aspen. Like all poplars, trembling aspen reproduces quickly and easily by means of root suckers, with the result that it comes in very rapidly on new burns.



LEAVES—Alternate, simple, nearly circular in outline, abruptly pointed, fine-toothed with rounded teeth, $1\frac{1}{2}$ to 3 inches long, borne on long, flattened stems; shiny dark green above, yellowish-green below; quivering in the slightest breeze.

FLOWERS—March-April, from special flower buds before the leaves; unisexual; in drooping, hairy catkins, the male and female on different trees.

FRUIT—May-June, before the leaves are fully grown; a greenish capsule, about $\frac{1}{4}$ of an inch long, arranged in catkins and containing the small tufted seeds; opening at maturity.

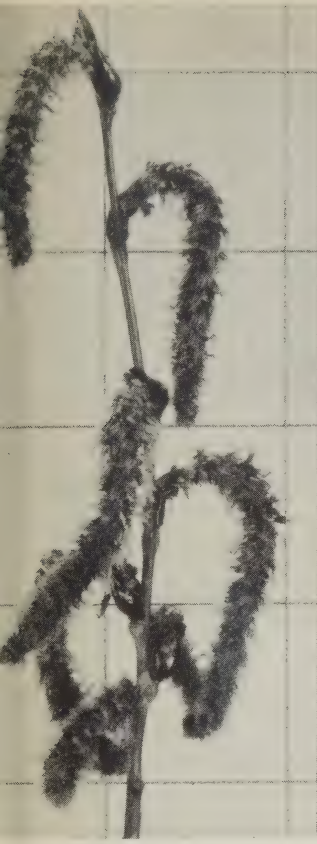
TWIGS—Slender, shiny, reddish-brown. Terminal bud about $\frac{1}{4}$ of an inch long, sharp-pointed, slightly resinous, reddish-brown, similar to the lateral buds; flower buds larger.

BARK—At first smooth, greenish to yellowish-brown; becoming rough, furrowed, grey to brown.

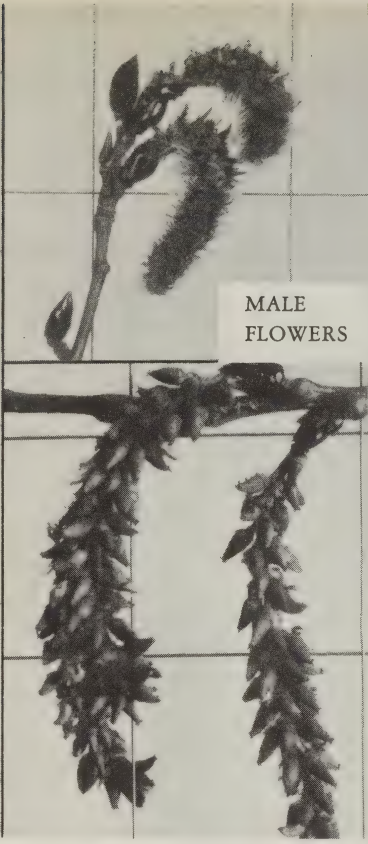
WOOD—Light, soft, not strong, fine-textured, diffuse-porous; greyish-brown with almost white sapwood.

The wood is used for veneer, matches, and boxes, and in the manufacture of excelsior and pulp, particularly soda pulp. In the prairie region, where other species are scarce, it is extensively cut into lumber and is also valuable for fuelwood.

TREMBLING ASPEN

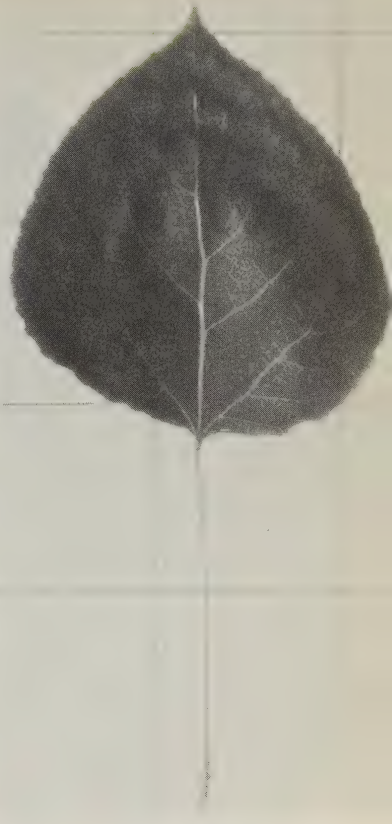


FEMALE FLOWERS

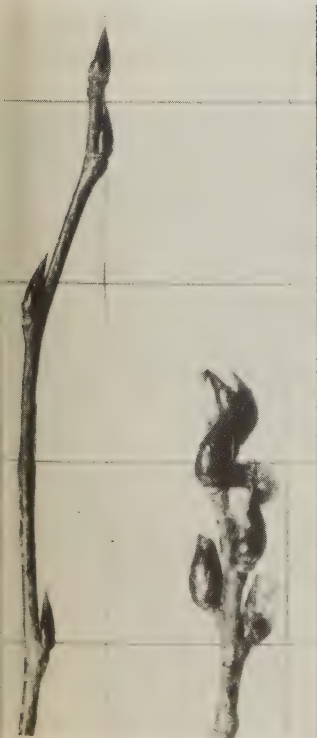


MALE
FLOWERS

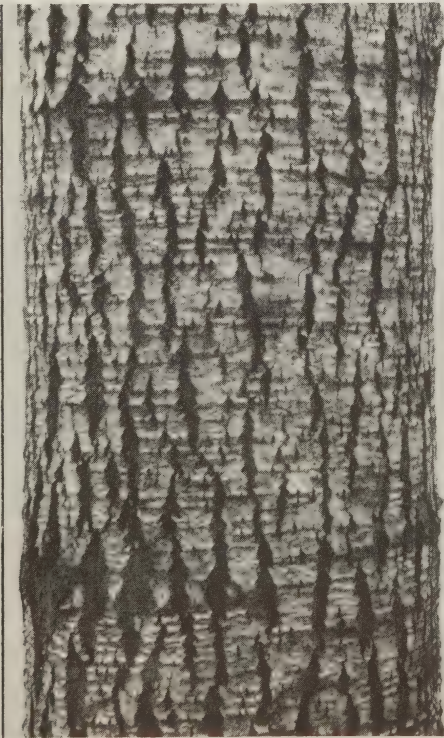
FRUIT (CAPSULES)



LEAF



WINTER TWIGS



MATURE BARK



TREES, COCHRANE, ONT.

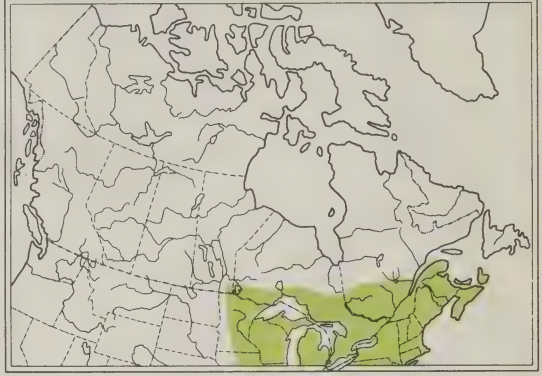
THE POPLARS

LARGETOOTH ASPEN

Populus grandidentata Michx.

Largetooth poplar, poplar, bigtooth aspen.

The largetooth aspen is usually a medium-sized tree 50 to 60 feet in height (occasionally reaching 100 feet) and 1 to 2 feet in diameter. The trunk is tall and straight, and in a crowded forest is frequently clear of limbs for more than two-thirds of its length. The crown, composed of moderately stout, somewhat horizontally spreading branches, is narrow, round-topped, and very open.



In Canada this aspen is found from Nova Scotia and Prince Edward Island westward, throughout south-western Quebec and southern Ontario south of the height of land dividing the basins of the Great Lakes and Hudson Bay; also in the extreme southeastern corner of Manitoba. It grows on the same types of soils as the trembling aspen, but seems to prefer moist sandy slopes or the borders of streams. It is found in pure stands or mixed with white pine, trembling aspen, balsam poplar, and white birch. This tree reproduces easily by root suckers and comes in quickly on new burns where there were a few trees present in the original stand.

The two aspens are very similar in general habit and main characteristics, but can be easily distinguished by their buds in winter and their leaves in summer.

LEAVES—Alternate, simple, nearly circular in outline, short-pointed, very coarse-toothed with large teeth, 2 to 4 inches long, borne on flattened stems; dark green above, pale green below.

FLOWERS—March-April, before the leaves, from separate flower buds; unisexual; in drooping, hairy catkins, male and female on different trees.

FRUIT—May-June, as the leaves open; a pale green, downy capsule, $\frac{1}{8}$ to $\frac{1}{4}$ of an inch long, borne loosely in drooping catkins; opening at maturity.

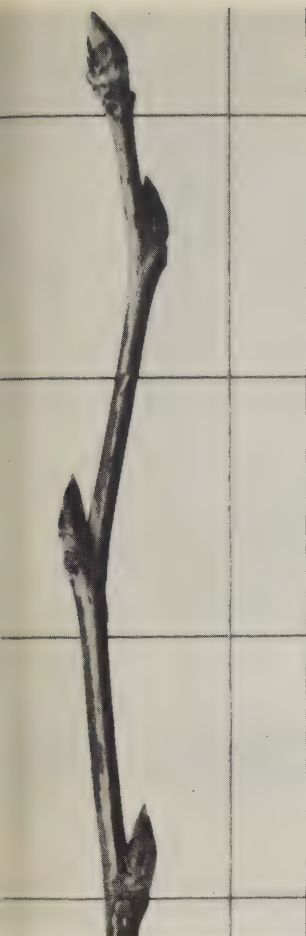
TWIGS—Moderately stout, reddish-brown to brownish-grey, more or less downy. Terminal bud about $\frac{1}{4}$ of an inch long, grey-downy, similar to the lateral buds. Flower buds larger.

BARK—At first smooth, greenish-grey; becoming brownish, or almost black and deep-furrowed at the base of old trunks.

WOOD—Light, soft, not strong, fine-textured, diffusely porous; light brown with thin, almost white sapwood.

The wood is used extensively for veneer, matches, and boxes, and in the manufacture of pulp.

LARGETOOTH ASPEN



WINTER TWIG

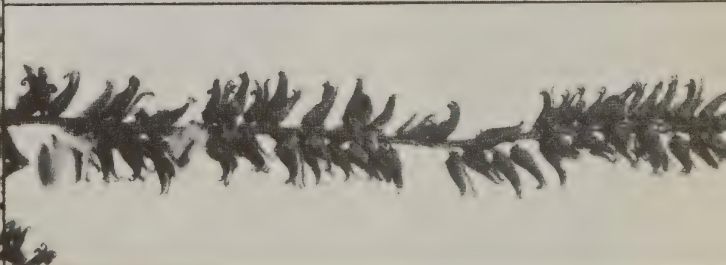
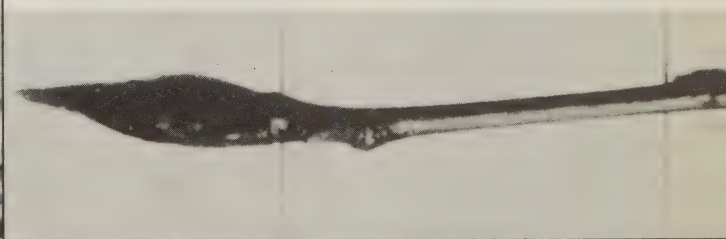


LEAF

WINTER TWIG



MATURE BARK



FRUIT (CAPSULES),
ENLARGED

THE POPLARS

BALSAM POPLAR

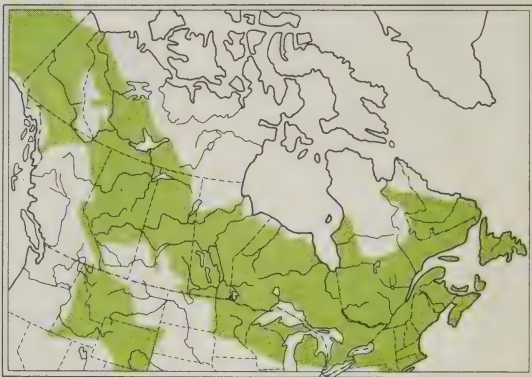
Populus balsamifera L.

Balm, balm poplar, black poplar, balm of Gilead, rough-barked poplar, poplar, tacamahac.

The balsam poplar is commonly a medium-sized tree 50 to 60 feet in height and 1 to 2 feet in diameter, but in the river valleys north of the prairies it has been known to reach a height of 100 feet and diameters of more than 4 feet. It usually develops a long cylindrical trunk and a narrow open crown composed of a few stout mostly ascending limbs. The root system is usually shallow.

It is distributed in Canada from the Atlantic Coast and northern Quebec westward to the Yukon and northern and eastern British Columbia. For the most part, this species is confined to rich moist soils such as the banks of streams and bottomlands, where it is found in small pure stands or mixed with various willows, alders, white birch, balsam fir, and the black and white spruces. It is very intolerant of shade.

In summer this species is easily distinguished from the other poplars of Eastern and Central Canada by its oval or heart-shaped leaves. It is sometimes mistaken for the black cottonwood of British Columbia and the Yukon, but differs from that species in its smooth, hairless fruit. Trees with heart-shaped, somewhat downy leaves can be separated as the variety *subcordata* Hylander.



LEAVES—Alternate, simple, oval (var. *subcordata* heart-shaped), sharp-pointed, fine-toothed, 3 to 6 inches long; dark green above, pale green, generally with rusty-brown resinous blotches below.

FLOWERS—April-May, before the leaves, from separate flower buds; unisexual; in drooping, densely flowered catkins, male and female on different trees.

FRUIT—May-June, a smooth, light brown capsule, about $\frac{1}{4}$ of an inch long, containing the small tufted seeds, borne in catkins; opening at maturity.

TWIGS—Moderately stout, shiny, smooth, bright reddish-brown. Terminal bud sharp-pointed, $\frac{1}{2}$ to 1 inch long, shiny, dark red to chestnut-brown, exuding a fragrant resin, larger than the laterals.

BARK—At first smooth, greenish to reddish-brown; becoming dark grey and furrowed into thick ridges.

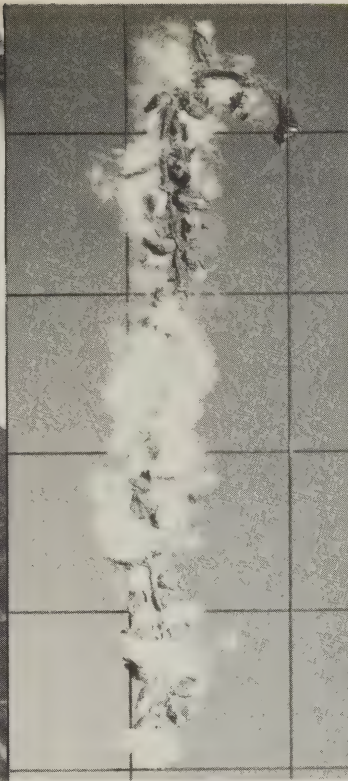
WOOD—Light, soft, not strong, semi-ring to diffuse-porous; greyish-white to greyish-brown with paler sapwood.

On the prairies, balsam poplar is widely planted for wind-breaks and shelter-belts. The wood is used for lumber, veneer, excelsior, pulp, and fuelwood.

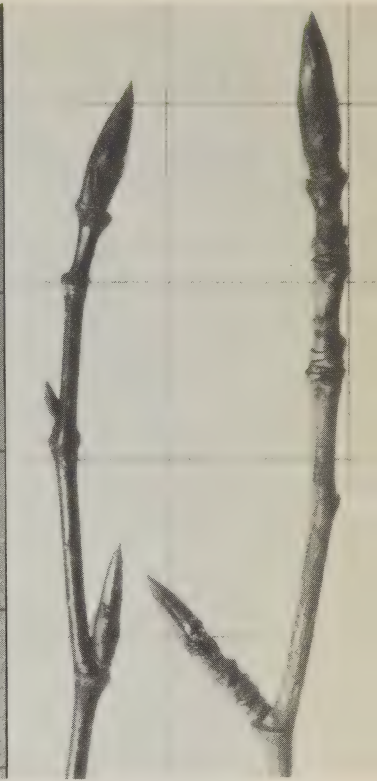
BALSAM POPLAR



FRUIT (CAPSULES)



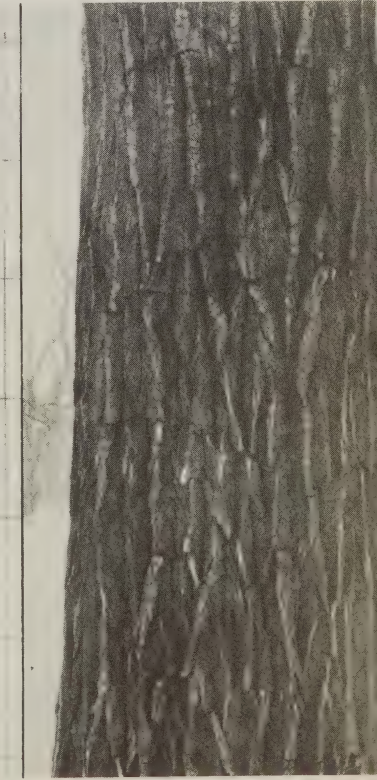
OPENED CAPSULES



WINTER TWIGS



LEAVES



MATURE BARK

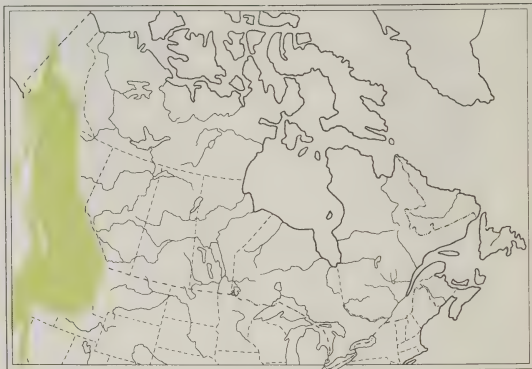
THE POPLARS

BLACK COTTONWOOD *Populus trichocarpa* Torr. and Gray

Balsam cottonwood, balm cottonwood, western balm, cottonwood, western balsam poplar.

The black cottonwood, the largest of the native poplars, is one of our fastest growing hardwoods. It is a tree 80 to 125 feet in height and upwards of 3 or 4 feet in diameter. Grown in a dense stand it develops a long, clear bole and a narrow, open crown of short limbs. Even when grown in the open the trunk is straight, and large trees are often clear of branches for more than half their length.

This tree is found from Alaska and southern Yukon southward throughout British Columbia and at Pincher Creek in Alberta, where it grows in association with such conifers as Douglas fir, Engelmann spruce, and western white spruce, and with white birch. It is found occasionally in small pure stands. Like most poplars, it demands a moist soil and is, therefore, confined mostly to river bottom-lands. It is very intolerant of shade, and when growing with other trees it survives only by virtue of its rapid growth, which enables it to keep ahead of the other species. This tree is frequently mistaken for the balsam poplar of Eastern and Central Canada.



LEAVES—Alternate, simple, oval or egg-shaped, sharp-pointed, fine-toothed, 3 to 5 inches long; dark green, smooth above, paler, silvery-white or rusty brown below.

FLOWERS—Spring, before the leaves; unisexual; in drooping, more or less hairy catkins, male and female on different trees.

FRUIT—Spring; a small, nearly round, greenish, somewhat hairy capsule, containing the small tufted seeds, borne in loose catkins; opening at maturity.

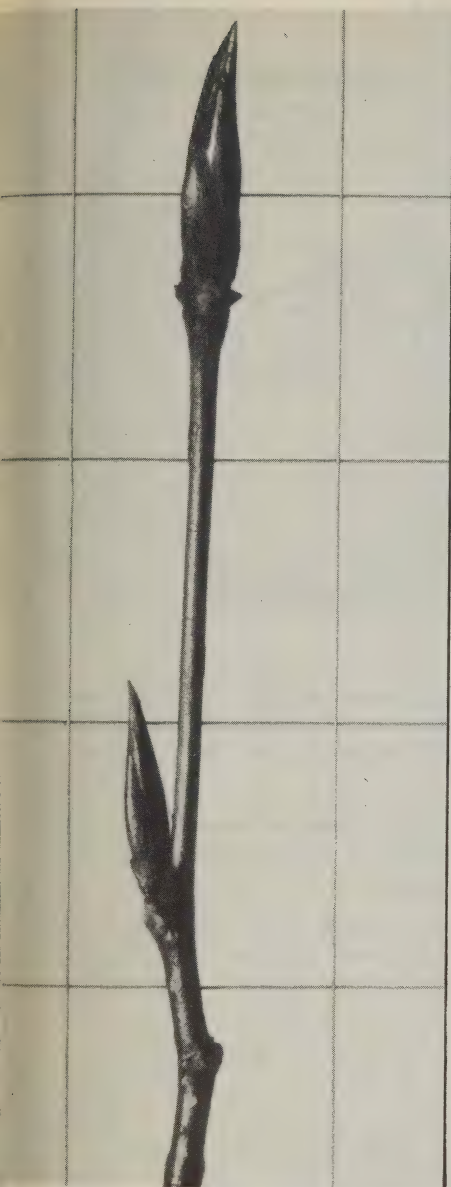
TWIGS—Moderately slender, round or slightly angled, smooth or hairy, red-brown to grey. Terminal bud curved, long-pointed, about $\frac{3}{4}$ of an inch long, orange-brown, resinous, larger than the laterals.

BARK—Smooth and greenish yellow to grey on young stems; dark grey and furrowed on old trunks.

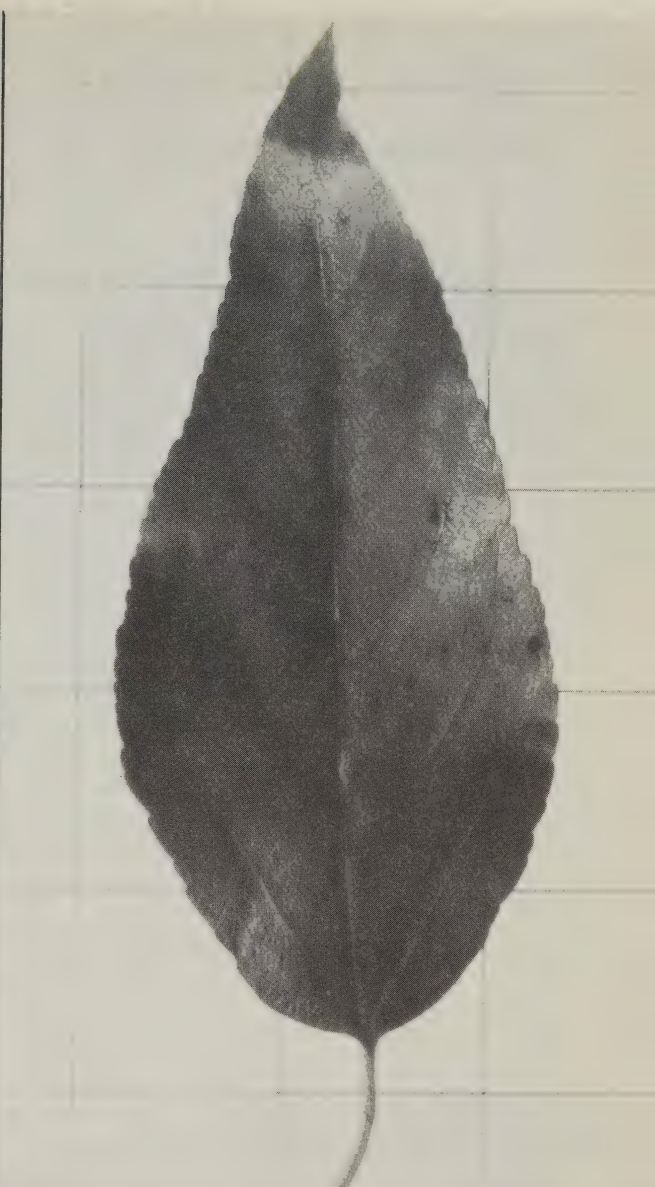
WOOD—Light, soft, weak, straight-grained, semi-ring to diffuse-porous; greyish-white to greyish-brown with paler sapwood.

This is the most important broad-leaved tree in British Columbia and produces wide, clear lumber which is used for boxes, cooperage, veneer, and plywood. It is also used to some extent for match stock and pulpwood.

BLACK COTTONWOOD

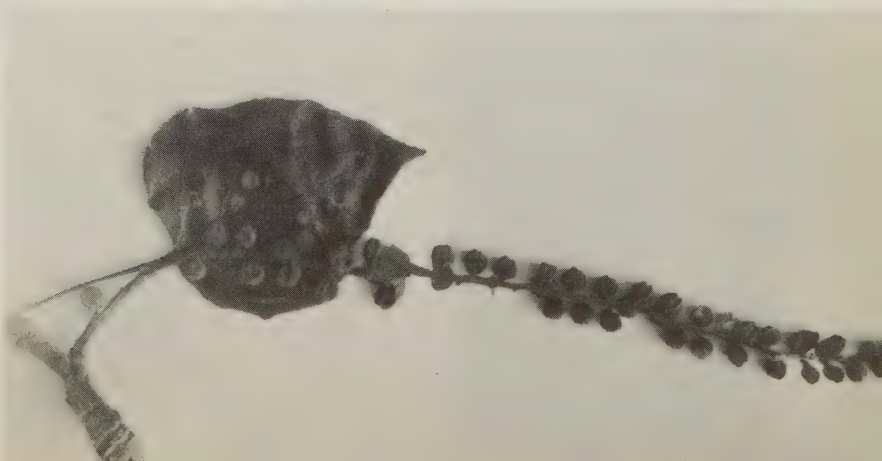


WINTER TWIG



LEAF

FRUIT AND
IMMATURE
LEAF,
ACTUAL SIZE



THE POPLARS

EASTERN COTTONWOOD

Populus deltoides Marsh.

Cottonwood, common cottonwood.

The eastern cottonwood is one of the largest of the poplars, frequently reaching heights of 75 to 100 feet and diameters of 2 to 4 feet or more. Young trees form dense, conical crowns of spreading limbs. Open-grown trees develop massive trunks which are sometimes divided near the ground into several stout, gradually spreading limbs, and very broad, open crowns. In the forest old trunks are long and clear and the crowns are much smaller. This tree usually stands on a shallow but very widely spread system of lateral roots.

In Eastern Canada this tree is found scattered in southern Quebec and in southern Ontario. West of the Great Lakes it is found in southern Manitoba and in southern Saskatchewan, where its range overlaps that of the plains cottonwood. It is a tree that requires considerable moisture and is, therefore, mostly confined to the banks of streams and bottoms of river valleys.

This species is distinguished from the plains cottonwood by its larger size, light yellow twigs, and somewhat hairy winter buds.



LEAVES—Alternate, simple, triangular in outline, coarse-toothed with rounded teeth, 2 to 4 inches long; bright glossy green above, paler below, borne on slender, flattened stems.

FLOWERS—March-April, before the leaves, from special flower buds; unisexual; in drooping catkins, male and female on different trees.

FRUIT—May-June; a greenish capsule, about $\frac{1}{3}$ of an inch long, borne alternately along the catkin axis, containing the small tufted seeds; opening at maturity.

TWIGS—Stout, smooth, yellowish-brown, often angled or ridged. Terminal bud sharp-pointed, about $\frac{1}{2}$ inch long, chestnut-brown, smooth, shiny, resinous; lateral buds similar, smaller.

BARK—Smooth, greenish-yellow on young stems; dark grey and deeply furrowed on old trunks.

WOOD—Light, soft, not strong, fine-textured, diffuser-porous; greyish-white to greyish-brown with paler sapwood.

This tree grows very rapidly, is fairly hardy, and for these reasons is used considerably by the farmers in Western Canada for planting in shelter-belts and for fuelwood. The wood is used for lumber and veneer, but the supply is limited.

EASTERN COTTONWOOD

WINTER
TWIG



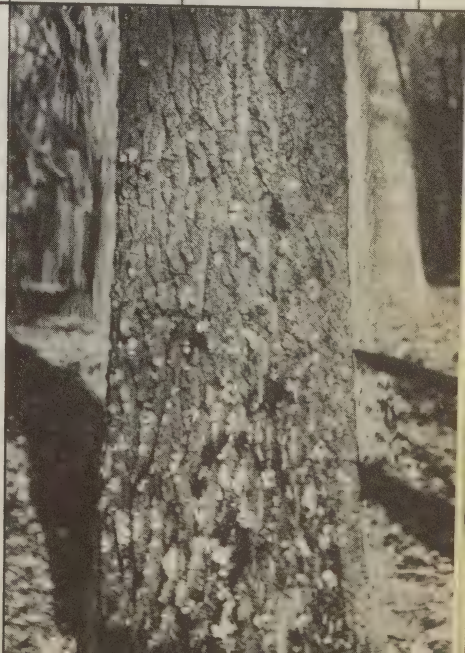
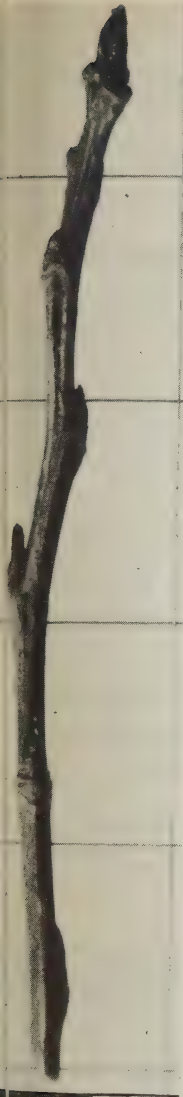
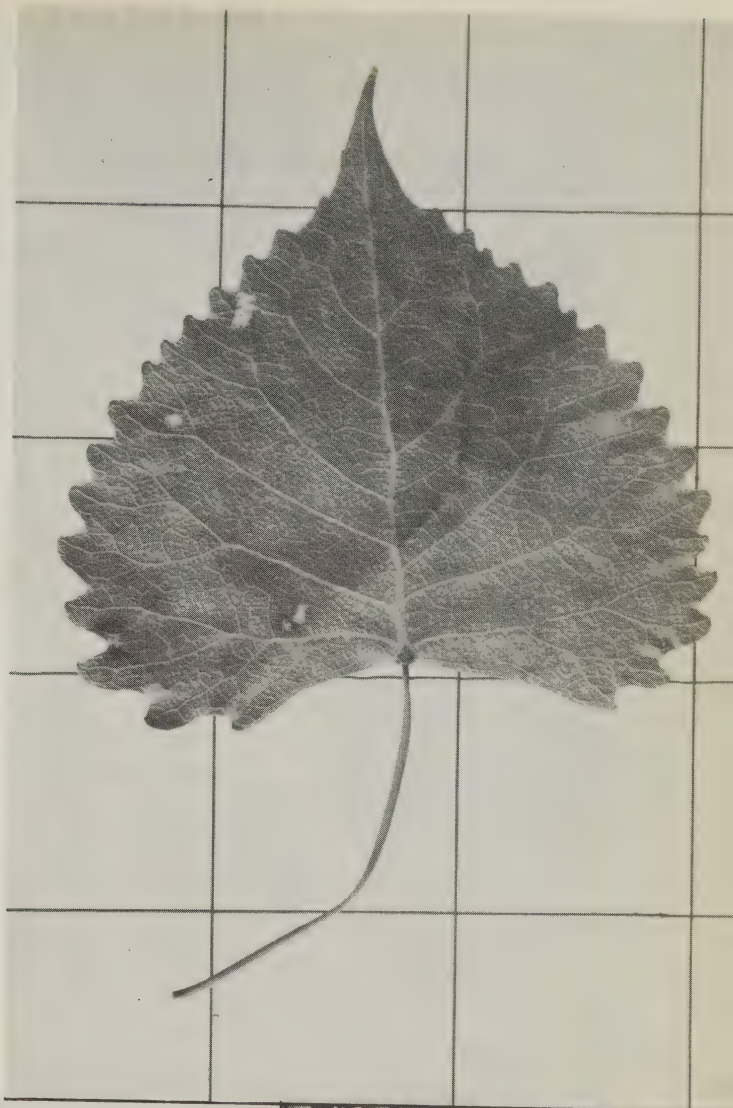
LEAF



FRUIT
(CAPSULES)



MATURE
BARK



THE POPLARS

PLAINS COTTONWOOD

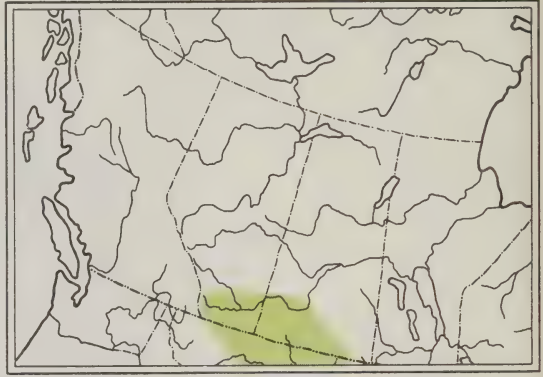
Populus sargentii Dode

**Western cottonwood, river cottonwood,
Great Plains cottonwood.**

The plains cottonwood is a medium to large tree 40 to 100 feet in height and 2 feet or more in diameter, with a straight, massive trunk and stout, strong, wide-spreading branches. The crown is somewhat pyramidal in outline on young trees, becoming very broad and usually rather flat with age.

This cottonwood is found in Canada from southern Saskatchewan westward to southern Alberta; it has also been reported from southwestern Manitoba. In the eastern part of its range it is frequently confused with the closely related eastern cottonwood, but can be distinguished from that species by its hairy winter buds, light yellow twigs, and more coarsely toothed leaves.

This tree is the poplar commonly found along the streams and rivers of the western prairies. It requires considerable moisture and will not grow well on a dry site. It does not reproduce as readily by means of root suckers as do the other species of poplar.



LEAVES—Alternate, simple, triangular in outline, very coarse-toothed, 2 to 4 inches long, usually broader than long; light green, very shiny above, paler below.

FLOWERS—Spring, before the leaves; unisexual; in smooth, drooping catkins, male and female on different trees.

FRUIT—Early summer; a capsule, about $\frac{2}{5}$ of an inch long, arranged in drooping catkins and containing the small tufted seeds; opening at maturity.

TWIGS—Stout, smooth, often angled, light yellow. Terminal bud about $\frac{1}{2}$ inch long, hairy, olive-green to brown, resinous; lateral buds similar.

BARK—At first grey and smooth; later deeply furrowed into broad, rounded, scaly ridges.

WOOD—Light, soft, weak, brittle, diffuse-porous.

Plains cottonwood is of little commercial importance. It is used locally for fuelwood and fence-posts and is popular as a shade tree.

PLAINS COTTONWOOD

LEAVES



FRUIT
(CAPSULES),
ACTUAL
SIZE



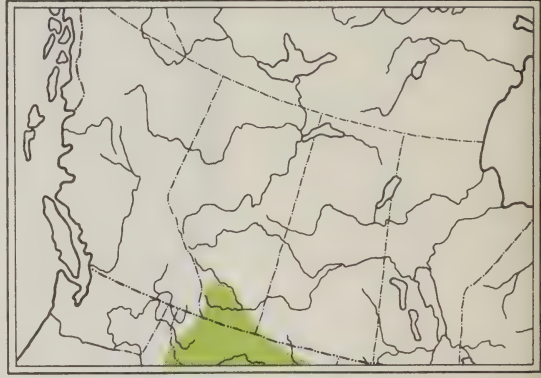
THE POPLARS

NARROWLEAF COTTONWOOD *Populus angustifolia* James

Black cottonwood, willow-leaved cottonwood, bitter cottonwood.

The narrowleaf cottonwood is usually a medium-sized tree 35 to 40 feet in height and 12 to 18 inches in diameter. Occasionally under exceptionally good growing conditions it may reach a height of 50 to 60 feet. It is a slender tree for its height, and forms a narrow, pyramidal crown of slender, mostly upright, branches.

Like the lanceleaf cottonwood, for which it is sometimes mistaken, it is confined to the banks of streams in southern Alberta. These two trees are most easily separated by their leaves. The leaf of the narrowleaf cottonwood resembles more the leaf of a broad-leaved willow than that of a poplar. The base is rounder, the teeth are finer, and the stem is shorter than that of the lanceleaf cottonwood. The twigs are yellow-green or orange in colour; those of the lanceleaf cottonwood are yellow-brown.



LEAVES—Alternate, simple, lance-shaped, fine-toothed, sharp-pointed or rounded, 2 to 4 inches long, thin; bright yellow-green above, paler below.

FLOWERS—Spring, before the leaves, from separate flower buds; unisexual; in dense, smooth, drooping catkins; male and female on different trees.

FRUIT—Spring; a capsule, about $\frac{1}{4}$ of an inch long; arranged in catkins; containing the small tufted seeds; opening at maturity.

TWIGS—Slender, round, yellow-green or orange-coloured. Terminal bud $\frac{1}{4}$ to $\frac{3}{4}$ of an inch long, slender, long-pointed, chestnut-brown, very resinous.

BARK—Usually smooth, yellow-green; becoming shallowly furrowed at the base of old trunks.

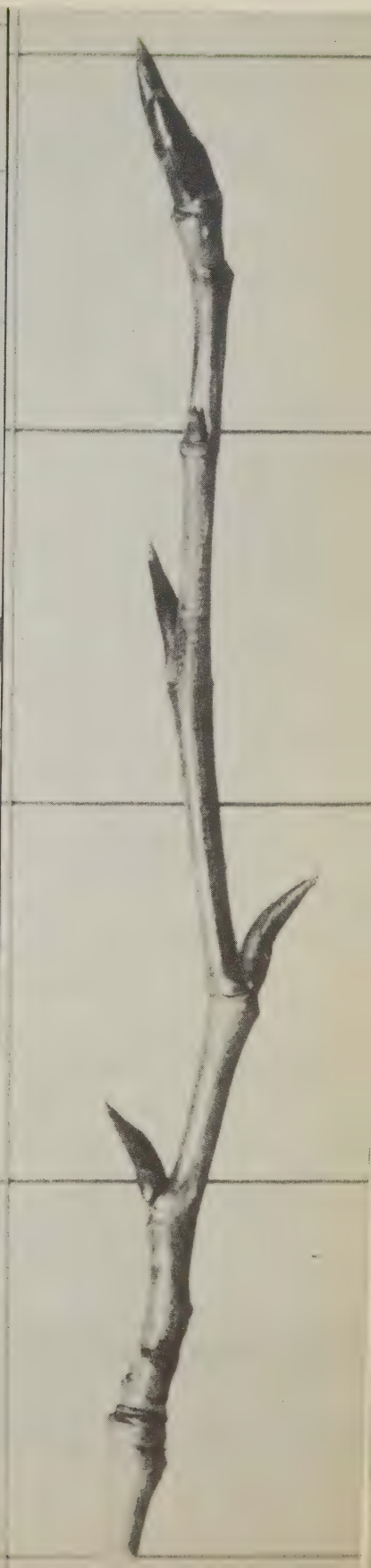
WOOD—Light, soft, not strong, semi-ring to diffuse-porous, greyish with nearly white sapwood.

This tree is of little commercial importance except for fuelwood and fence-posts.

NARROWLEAF COTTONWOOD



LEAVES



WINTER TWIG

LANCELEAF COTTONWOOD

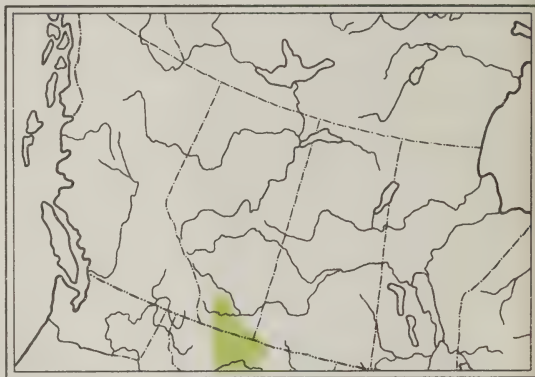
Populus acuminata Rydb.

Rydberg's cottonwood, smoothbark cottonwood.

The lanceleaf cottonwood is a medium-sized tree 35 to 40 (rarely 50 to 60) feet in height and 1 to 2 feet in diameter. It forms a rounded compact crown of stout, spreading, or ascending branches. The trunk is stout, usually crooked, and often inclined.

Some authorities consider this tree to be a hybrid of the narrowleaf and plains cottonwoods. It is not abundant in Canada, being confined to the banks of streams in southern Alberta where it grows with its supposed parents and various willows. It is rarely found on a dry site or in pure stands.

In habit and distribution it is similar to the narrowleaf cottonwood, for which it is often mistaken. It differs, however, in its broader, more coarsely toothed leaves, very long leaf stems, and yellow-brown twigs. In contrast, the narrowleaf cottonwood has finely toothed, willow-like leaves, short leaf stems, and yellow-green or orange-coloured twigs.



LEAVES—Alternate, simple, broadly lance-shaped, coarse-toothed, 2 to 4 inches long, relatively thick; dark green, shiny above, dull green below.

FLOWERS—Spring, before the leaves, from separate flower buds; unisexual; in loosely arranged, smooth, drooping catkins, male and female on different trees.

FRUIT—Spring, a capsule about $\frac{1}{3}$ of an inch long; arranged in catkins, containing the small tufted seeds; opening at maturity.

TWIGS—Slender, round or slightly angled, smooth, yellow-brown. Terminal bud $\frac{1}{3}$ to $\frac{3}{4}$ of an inch long, narrow, sharp-pointed, smooth; chestnut-brown, somewhat resinous.

BARK—Smooth, almost white at first, becoming grey-brown; deeply furrowed on old trunks.

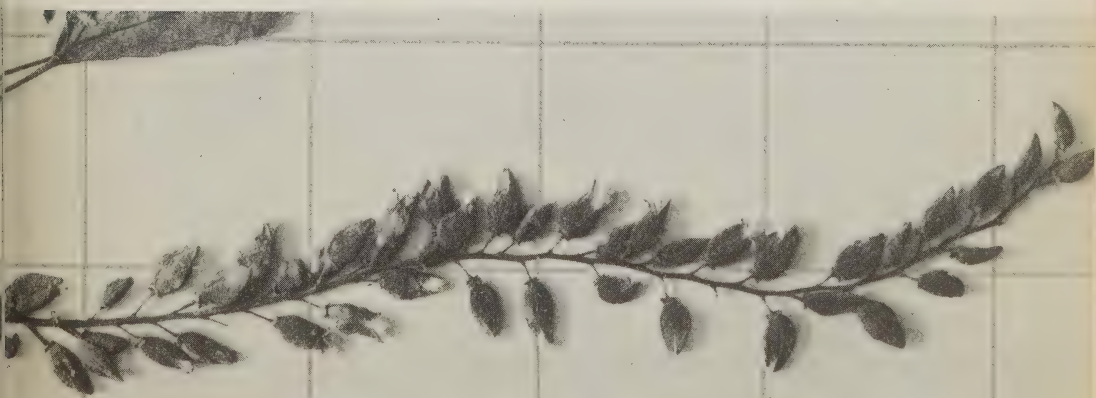
WOOD—Light, soft, not strong, semi-ring to diffuse-porous; greyish, with paler sapwood.

The wood is used locally for fuelwood and fence-posts. Otherwise the tree is of little commercial importance.

LANCELEAF COTTONWOOD



LEAVES



FRUIT

The WILLOWS *Salix* L.

The willows comprise a large and distinctive genus of deciduous shrubs and trees with a wide distribution in many parts of both the Old and the New Worlds. More than 250 species have been described, of which about 75 are found in North America. The majority of these occur in Canada.

The different species vary widely in size and habit of growth. Some are shrubs only a few inches high growing in mats on high mountain slopes and in the Arctic regions. Others are large shrubs or small, half-shrubby trees occurring for the most part in thickets along the banks of streams and on low wet places. Only a comparatively small number of the native species regularly reach tree size.

The willows can be readily distinguished from other trees by their bitter bark and by their winter buds, which have a single cap-like scale. In most species these winter buds are long, narrow, and pointed, and have the appearance of being pressed against the side of the twig. The twigs are slender, often brittle, and usually highly coloured. There is no true terminal bud.

The leaves are alternate, simple, usually fine-toothed, mostly long, narrow, and pointed at both ends. They are generally smooth and dark green above, paler and covered below with fine down or a whitish bloom. The male and female flowers are borne in unisexual catkins on different plants. They appear in the spring before or with the leaves, depending upon the species. The fruit is a small capsule about $\frac{1}{4}$ of an inch long. It matures in the early summer at about the same time as the leaves reach their full size. The seed is very minute, light, and tufted, and is easily carried long distances by the wind. It is shed at maturity.

The wood of the different species is similar. It is light and soft, but possesses considerable toughness and shock-resistance for its weight. In Canada the wood is of little economic importance. It is used for artificial limbs and, on the prairies where other trees are scarce, for fuelwood and fence-posts.

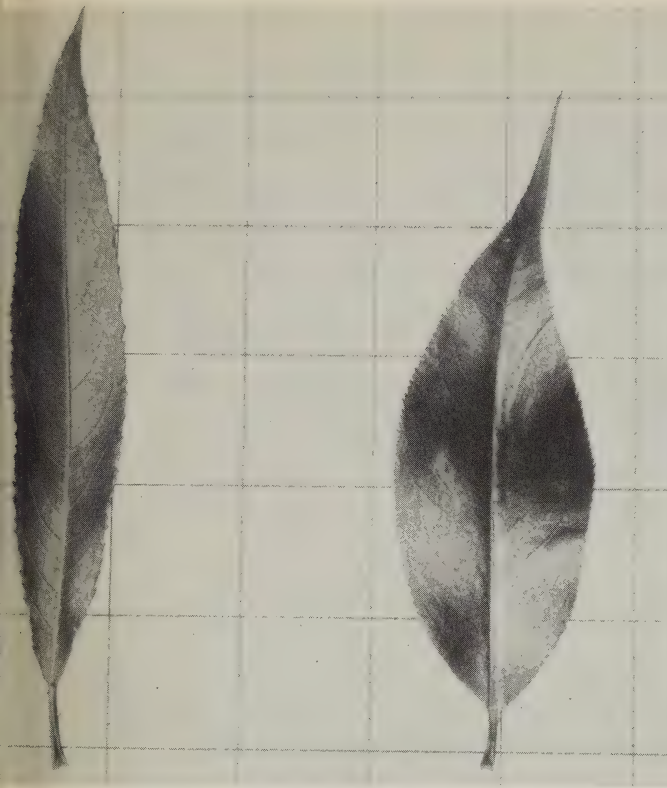
Separation of the various species is mainly by floral and fruit characteristics which can be examined for a short time only in the spring, but even then their determination is often a matter of great difficulty and requires considerable study.

The black willow, *Salix nigra* Marsh., found from Nova Scotia to southern Ontario, is the largest willow native to Canada. It has long, narrow, lance-shaped leaves.

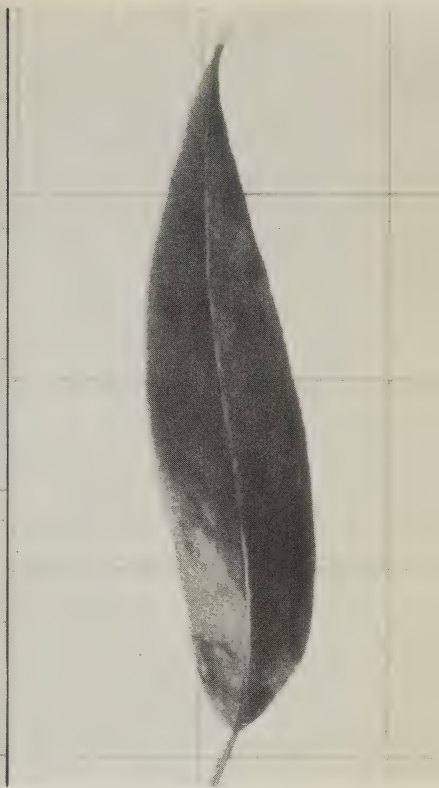
The peachleaf willow, *Salix amygdaloides* Anderss., ranges from southern Quebec to southern British Columbia. It has dark grey bark and fine-toothed, lance-shaped leaves with the tips drawn out into a very fine point.

The Pacific willow, *Salix lasiandra* Benth., is the largest willow on the Pacific Coast. It is distinguished by rough dark grey bark and long narrow leaves which have tapering tips, usually curved and twisted to one side.

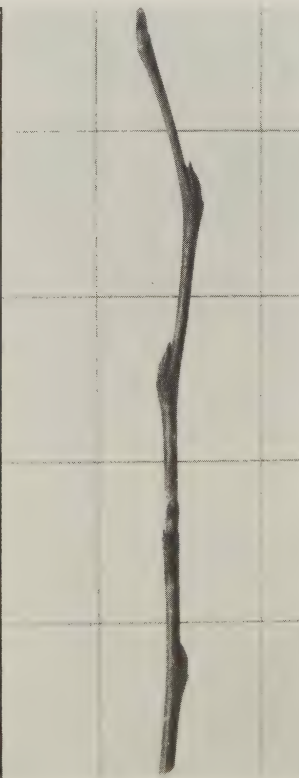
The white willow, *Salix alba* L., and the crack willow, *Salix fragilis* L., both large trees native to Europe, are now naturalized in many parts of Eastern Canada. The first has the two surfaces of the leaves more or less covered with whitish, silky hair, the second is named for its brittle twigs, which often litter the ground after a storm. The weeping willow, *Salix babylonica* L., also introduced, has long, slender, pendulous twigs. It is planted as a lawn tree.



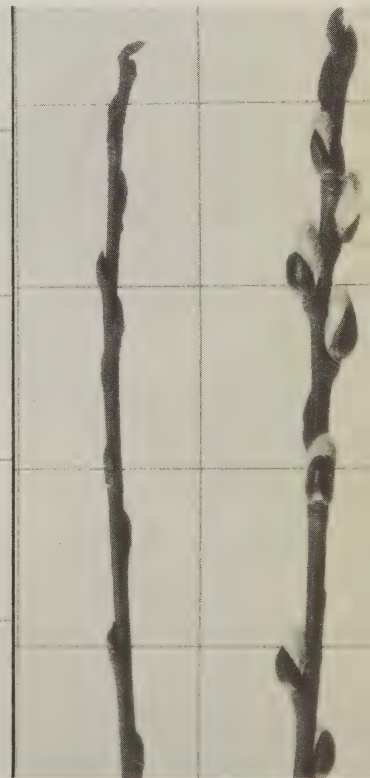
LEAVES



MALE FLOWERS



WINTER TWIGS



OPENED FLOWER BUDS

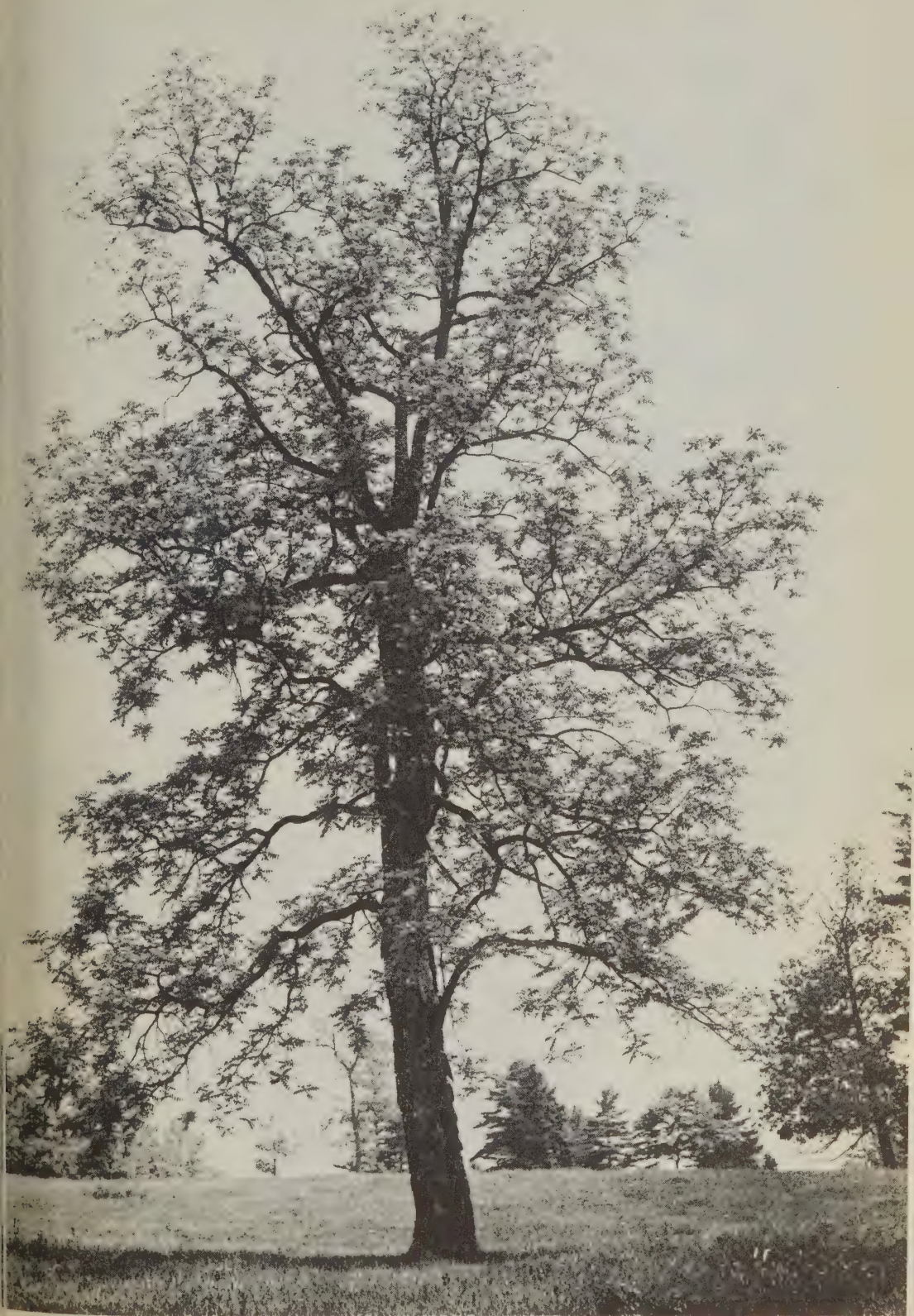
The WALNUTS *Juglans* L.

The 12 to 15 known species of walnut are widely distributed throughout the hardwood forests of North and South America, South-eastern Europe, Northern Africa, and Southern Asia. Six species are native to North America, but only 2 of these, the black walnut and the butternut, are found in Eastern Canada. None occur in the West.

The wood of the walnuts is very valuable, but that of the native species is of little commercial importance in Canada because of the limited supply. The Circassian, English, and European walnut woods are obtained from the Persian walnut, *Juglans regia* L., and its varieties, which also produce the English or European walnut of commerce. This species is found naturally from Southeastern Europe across Asia to China. It is cultivated extensively in the Southern United States, especially in California, and in the warmer countries of Europe. The Siebold or Japanese walnut, *Juglans sieboldiana* Maxim., a native of Japan, is a hardy species occasionally planted in Canada as an ornamental tree.

The walnuts are small to large trees with furrowed, scaly bark; large deciduous, alternate, aromatic, compound leaves; and stout twigs with conspicuous leaf scars and chambered pith. All species have terminal buds. The flowers are unisexual, with both the male and female occurring on the same tree. The male flowers are borne in drooping catkins growing from lateral buds on the past season's growth. They emerge from the buds in the autumn as small cone-like bodies and remain in that state over winter. The female flowers are borne in short, few-flowered spikes on the tips of the new growth. The fruit is a rough, thick-shelled nut (technically a drupe, like that of the plum), and is enclosed in a semi-fleshy, more or less hairy, husk. It matures in one season, falling soon after.

The walnuts are closely related to the hickories and resemble them in many points. The two genera are easily separated by the pith, which is chambered in the walnuts and solid in the hickories.



FULL-GROWN WALNUT TREE, NIAGARA DISTRICT, ONTARIO

THE WALNUTS

BUTTERNUT

Juglans cinerea L.

White walnut.

The butternut is a small to medium-sized tree which seldom exceeds a height of 70 feet or a diameter of 3 feet. The trunk is usually short and divided into several large, spreading branches forming an irregular, rounded, or flat-topped crown. The smaller branches often dip down and then turn up again in a manner characteristic of many of the nut trees. It usually puts out a tap root on deep soils.

In Canada, the butternut is found from the valley of the St. John River in southwestern New Brunswick to the lower St. Lawrence Valley, and westward throughout the hardwood region of southwestern Quebec and in Ontario east and south of Georgian Bay. It has been reported as far north as Haileybury in Ontario.

It prefers rich, moist, well-drained loams but may be found on drier, rocky sites, especially those of a limestone origin. This tree is very intolerant of shade. It never occurs in pure stands, but is found singly or in small groups in association with other hardwood species.



LEAVES—Alternate, compound, 15 to 30 inches long, composed of 11 to 17 leaflets, borne in pairs on a stout, hairy stem. Leaflets lance-shaped, sharp-pointed, fine-toothed, 2 to 4 inches long; yellow-green, rough above, paler, hairy below.

FLOWERS—June, with the leaves; unisexual; the male in long, stout, yellowish-green catkins, the female in short, green and red spikes; both sexes appearing on the same twig.

FRUIT—October; an oblong, rough, sharply-ridged nut, with a sweet oily kernel, $1\frac{1}{4}$ to $2\frac{1}{4}$ inches long; enclosed in a thick, sticky, hairy, greenish husk, turning brown at maturity; borne in clusters of 2 to 5; falling at maturity.

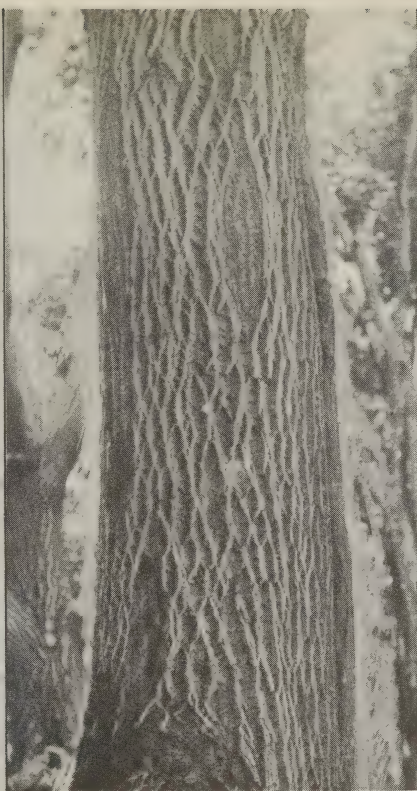
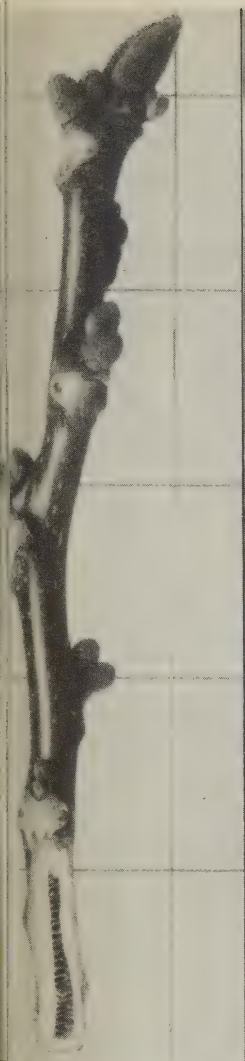
TWIGS—Stout, more or less hairy, greenish grey or buff-coloured, with dark brown, coarsely chambered pith. Terminal bud somewhat elongated, blunt, hairy, rusty-brown, $\frac{1}{2}$ to $\frac{2}{3}$ of an inch long; lateral buds similar but smaller. Leaf scars large, conspicuous, often fringed with hair along the upper edge.

BARK—Ashy-grey, at first smooth, becoming furrowed into broad intersecting ridges.

WOOD—Light, soft, weak, coarse-grained, diffuse-porous; light chestnut-brown with paler sapwood.

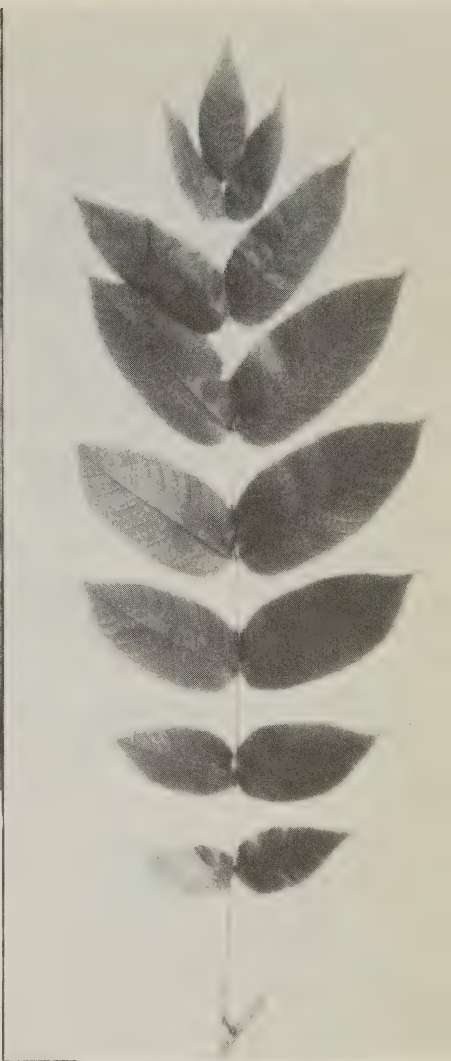
The butternut is not an important timber species. It is used occasionally for boat-building and interior work in houses, and can be finished to resemble black walnut. The nuts are edible.

BUTTERNUT

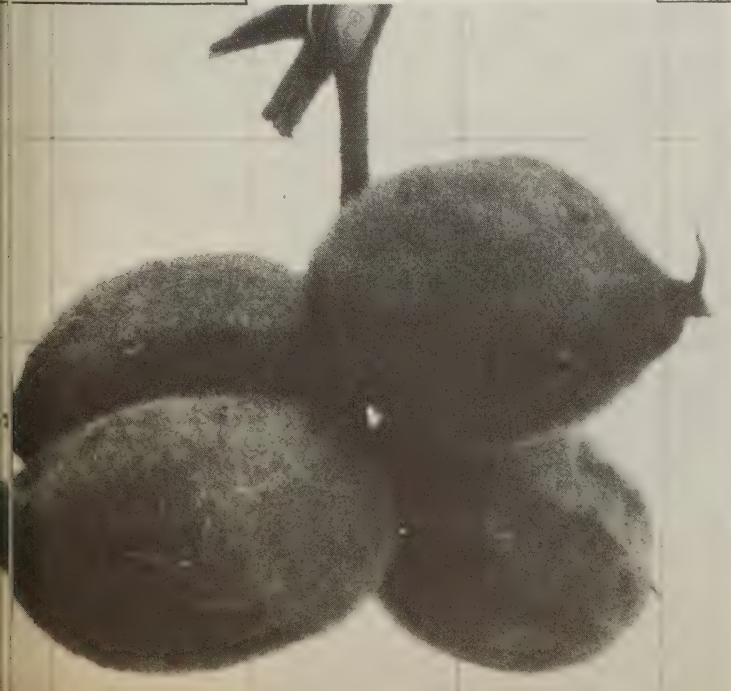


MATURE BARK

WINTER TWIG



COMPOUND LEAF



FRUIT
CLUSTER



THE WALNUTS

BLACK WALNUT

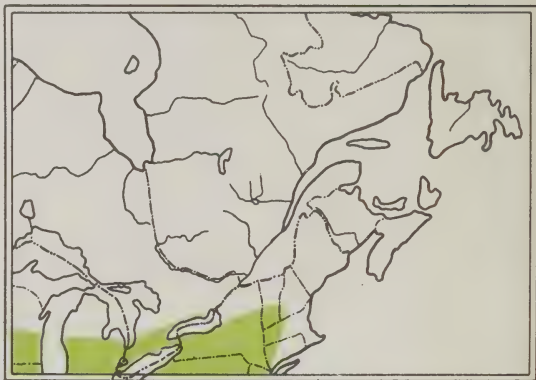
Juglans nigra L.

Walnut, American walnut, American black walnut.

The black walnut is one of the most valuable hardwood species native to North America. It is a medium to large tree 50 to 90 feet in height and 2 or 3 feet in diameter. When grown in the open, away from the competition of other trees, it forms a short trunk and an immense, rounded crown of wide-spreading branches, the lower ones drooping almost to the ground. In the dense forest, however, the trunk is tall and straight with a short, narrow, open crown. The root system usually comprises a deep tap root and several large lateral roots.

This species occurs naturally in Canada in that part of southern Ontario bordering Lakes Erie, Ontario, and St. Clair, but if protected from cold winds can be grown considerably north of its natural range.

Black walnut requires deep, rich, well-drained loam, where it is found in small groves or mixed with other species, such as white ash, black cherry, basswood, beech, tulip-tree, oak, and hickory.



LEAVES—Alternate, compound, 12 to 24 inches long, composed of 15 to 23 leaflets borne in pairs on a stout, hairy stem. Leaflets lance-shaped, sharp-pointed, sharp-toothed, 3 to 3½ inches long, shiny, smooth; dark yellow-green above, paler and hairy below. The terminal leaflet is frequently suppressed or absent.

FLOWERS—June, with the leaves; unisexual; the male in long, stout, greenish catkins, the female in short, greenish spikes; both sexes on the same twig.

FRUIT—October; an ovoid, corrugated, sweet, edible nut, 1 1/8 to 1½ inches long, enclosed in a thick, almost round, hairy yellowish-green husk; borne solitary or in clusters of 2 or 3; falling at maturity.

TWIGS—Stout, more or less hairy, orange-brown to light brown with buff-coloured, finely chambered pith. Terminal bud blunt, more or less hairy, grey, about 1/3 of an inch long; lateral buds much smaller. Leaf scars large, V-shaped, and conspicuous, lacking a fringe of hair on the upper margin.

BARK—Light brown and scaly on young stems, becoming dark brown and deeply fissured into broad, rounded, intersecting ridges on old trunks.

WOOD—Heavy, hard, strong, straight-grained, diffuse-porous; dark brown with paler sapwood.

The wood of black walnut is durable, easily worked, has a pleasing grain and takes a fine polish. It is used extensively for fine furniture and cabinet-making, interior work, boat-building, and gun stocks. The nuts are used for food. This tree is sometimes planted for decorative purposes.

BLACK WALNUT

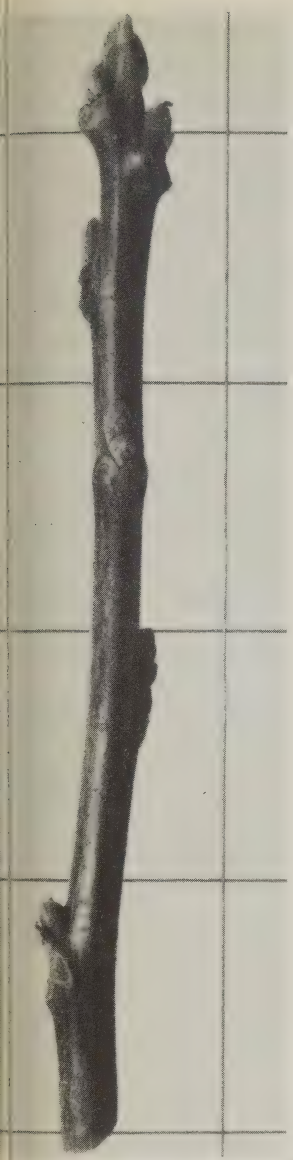
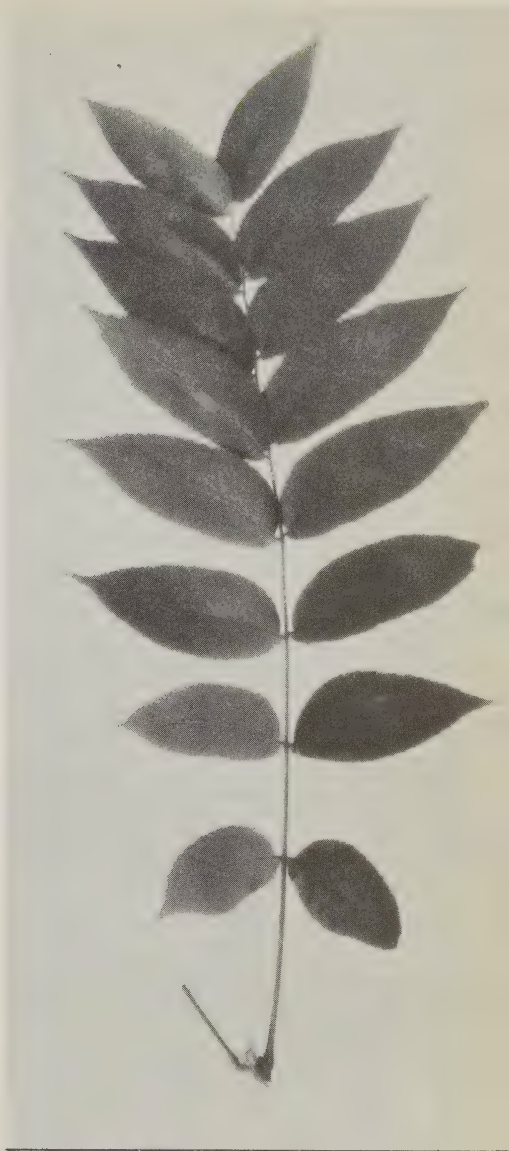
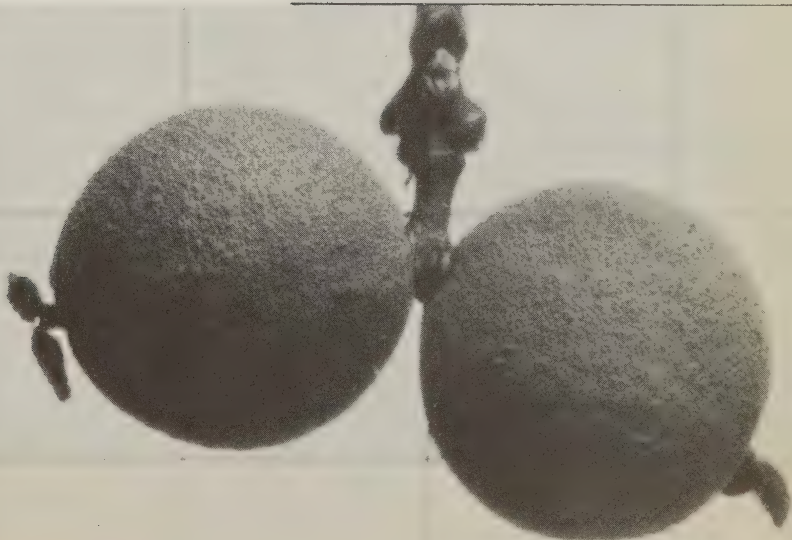
WINTER
TWIG



COMPOUND
LEAF



FRUIT
CLUSTER



The HICKORIES *Carya* Nutt.

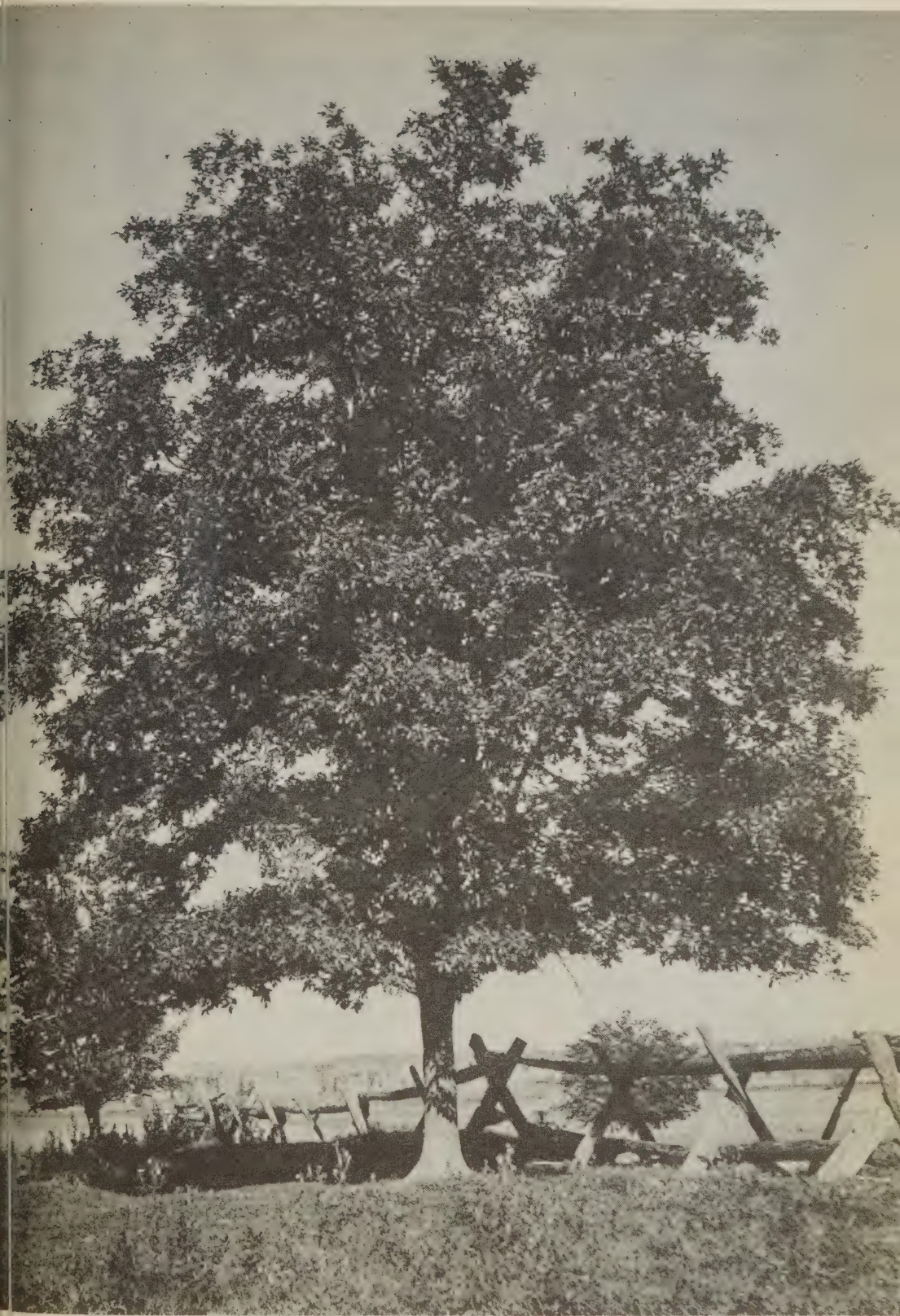
The hickories are mostly confined to the hardwood forests of the Eastern United States. The genus comprises about 22 species, of which 20 are found in North America, 1 in China, and 1 in Indo-China. Five of the North American species, the bitternut, pignut, shagbark, shellbark, and mockernut hickories extend north into Canada. The red hickory, *Carya ovalis* (Wang.) Sarg., is not known to occur here, but 1 of its varieties, the roundnut red hickory, var. *odorata* (Marsh.) Sarg., has been reported in southern Ontario. The roundnut may easily be confused with the pignut hickory.

The hickories are medium to large deciduous trees with alternate, compound, more or less aromatic leaves, stout twigs with unchambered pith and large conspicuous leaf scars, and bark sometimes smooth, often scaly. The flowers are unisexual and appear after the leaves have begun to unfold from the bud. Both sexes are borne on the same tree, the male in slender three-branched catkins which arise from buds located along the sides of the twigs, the female in short spikes of from 2 to 10 flowers located on the tips of the new growth.

The fruit, which matures in one season, is a rounded nut with a smooth hard shell. It is enclosed in a husk which opens at maturity by splitting into 4 sections; the degree of splitting varies somewhat with the different species. In the bitternut and pignut hickories, the husk as a rule splits only half-way down from the tip toward the base. Only rarely does the splitting extend all the way to the base, and nut and husk usually fall to the ground together. In the other 3 species, the shagbark, shellbark, and mockernut hickories, and the variety of the red hickory, the husk splits right down to the base. At maturity nut and husk fall separately to the ground. The nuts of all but the bitternut hickory are sweet and edible.

The shellbark hickory, *Carya laciniosa* (Michx. f.) Loud., is closely related to the shagbark hickory and the 2 species have many characteristics in common. In Canada it is confined to the counties bordering on Lake Erie in southern Ontario. The shellbark is a large tree 60 to 90 feet in height with a tall slender slightly tapering trunk 2 to 3 feet in diameter, frequently in dense stands free of limbs for more than half its length. The leaves of the shellbark hickory are generally larger than those of the shagbark hickory and usually consist of 7 leaflets.

The wood of the different species is so similar in its technical qualities that it is usually sold simply as "hickory". It is among the hardest, toughest, and strongest of the Canadian hardwoods, few woods surpassing it in any of these qualities.



OPEN-GROWN BITTERNUT HICKORY,
NEAR OTTAWA, ONTARIO

THE HICKORIES

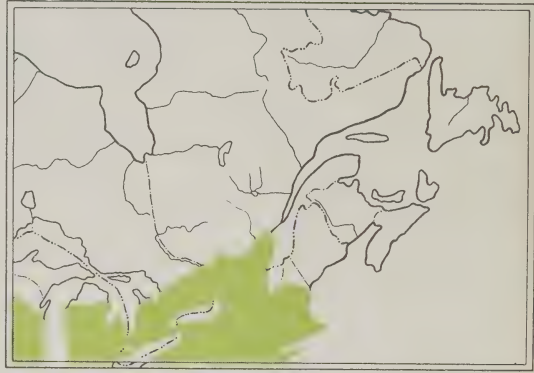
BITTERNUT HICKORY *Carya cordiformis* (Wang.) K. Koch

Bitternut, swamp hickory.

The bitternut hickory is usually a medium-sized tree 50 to 60 feet in height and 1 to 1½ feet in diameter. The trunk is long, has little taper, and in the forest is usually clear of branches for three-quarters of its length. The somewhat spreading crown is round-topped and broadest above the middle. It is formed of rather slender, more or less upright branches.

The bitternut is the most abundant hickory in Canada. It is found from Georgian Bay eastward throughout southern Ontario, in the lower Gatineau Valley, and throughout southwestern Quebec. It prefers low wet situations near streams, but is also found on higher ground on good soils. It is fairly tolerant of shade and grows scattered among other hardwoods, chiefly in associations of white elm, red and silver maple, yellow birch, and basswood.

The winter buds are the chief point of distinction between this species and the other hickories. While the buds of the other hickories are brown, those of the bitternut are sulphur-yellow.



LEAVES—Alternate, compound, 6 to 10 inches long, composed of 5 to 9 leaflets borne in pairs on a slender, hairy stem. Leaflets lance-shaped, sharp-pointed, coarse-toothed, 3 to 6 inches long, dark shiny green above, paler, hairy, below.

FLOWERS—May-June, after the leaves; unisexual, both sexes on the same twig; male in slender, green catkins, female in short, yellowish spikes.

FRUIT—October; a rounded, thin-shelled, bitter nut; enclosed in a thin, yellowish-green husk, ¾ to 1½ inches long, four-winged from the tip to about the middle.

TWIGS—Moderately stout, glossy, somewhat hairy, greenish to grey-brown. Terminal bud about ½ inch long, blunt, flattened, curved, sulphur-yellow, larger than the laterals.

BARK—On young stems, smooth, greenish-grey; on old trunks light grey or brown, roughened by shallow fissures and narrow flaky ridges.

WOOD—Heavy, hard, tough, strong, close-grained, ring-porous; dark brown with paler sapwood.

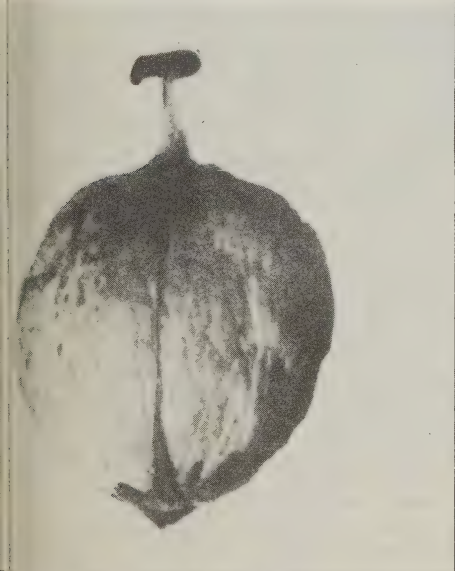
This is one of the more important Canadian hickories because of its wide distribution and common occurrence. The wood, although not quite as strong as that of some of the other hickories, is valuable for vehicle stock, tool handles, and sporting goods.

BITTERNUT HICKORY

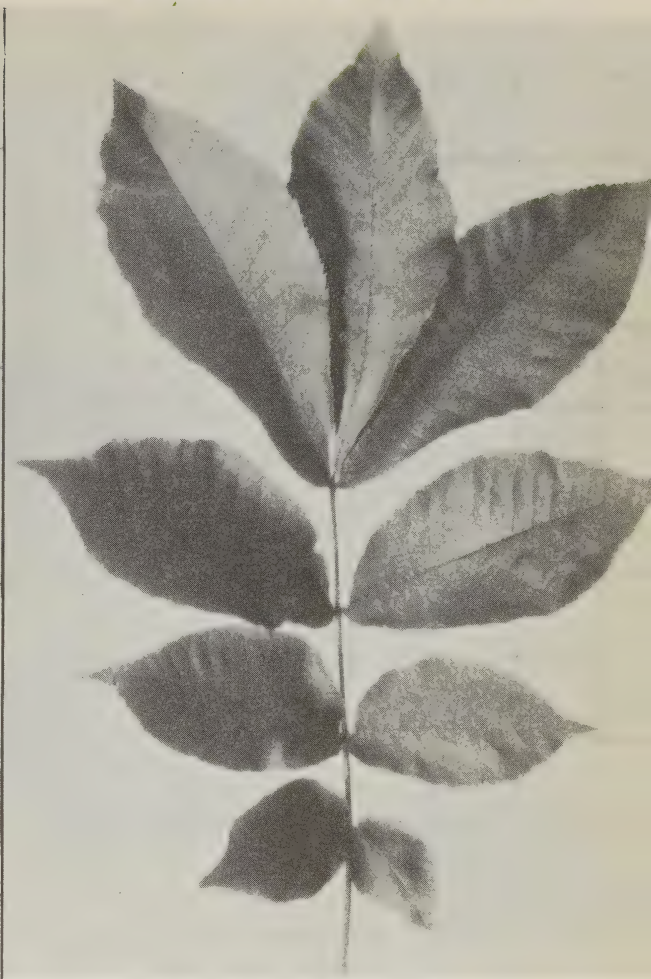


FRUIT CLUSTER

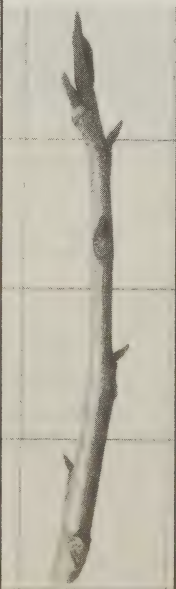
NUT



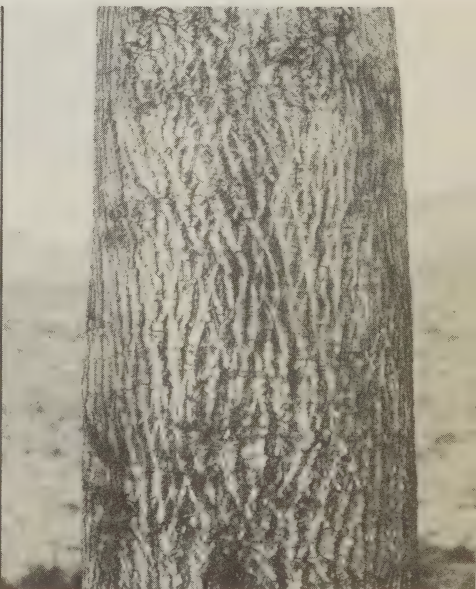
SPLIT HUSK



COMPOUND LEAF



WINTER TWIG



MATURE BARK

THE HICKORIES

SHAGBARK HICKORY

Carya ovata (Mill.) K. Koch

Shellbark hickory.

The shagbark hickory reaches a height of 60 to 80 feet and a diameter of 1 to 2 feet, and is one of the largest hickories. When grown in dense stands, the trunk is straight and columnar, topped by a small, flat crown. In the open the trunk is shorter and is divided into a few, short, stout, spreading limbs, forming a crown which in outline resembles an inverted cone. This tree puts down a deep tap root.



In Canada it occurs in the St. Lawrence Valley and throughout southwestern Quebec from Three Rivers westward, and in southern Ontario from the lower part of the Ottawa River to Lake Huron. It develops a long tap-root and requires a deep moist, fertile, well-drained soil. It is usually found in valleys, on moist hillsides, and on the borders of swamps. It sprouts readily from the stump, requires considerable light, and is usually found mixed with other hardwoods.

A variety of this species, the ashleaf shagbark hickory, var. *fraxinifolia* Sarg., has been reported near Kingston, Ontario. It has slightly smaller leaves (7 to 9 inches long), slender leaf-stems, and narrower, usually lance-shaped, leaflets.

LEAVES—Alternate, compound, 8 to 14 inches long, composed of 5 (rarely 7) leaflets borne in pairs on a stout, grooved, often hairy, stem. Leaflets widest about the middle, sharp-pointed, toothed, 4 to 7 inches long; dark yellow-green above, paler, often hairy, below.

FLOWERS—May-June, after the leaves; unisexual; male in slender green catkins, female in short spikes, both on the same twig.

FRUIT—October; a rounded, thin-shelled, sweet, edible, whitish nut; enclosed in a thick, dark reddish-brown husk, 1 to 2½ inches long, which splits nearly to the base at maturity.

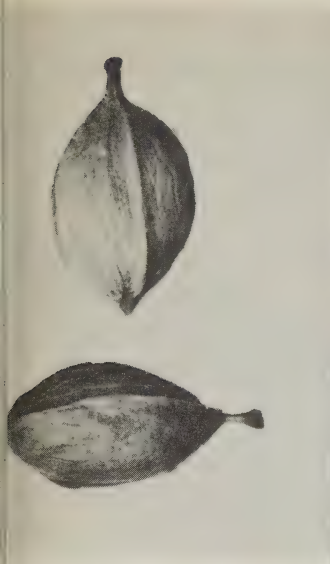
TWIGS—Stout, shiny, usually hairy, reddish-brown. Terminal bud ovoid, ½ to ¾ of an inch long, blunt, with loose, dark brown, hairy, sharp-pointed outer scales; lateral buds smaller, diverging from the twig.

BARK—On young stems, smooth, light grey; on old trunks, grey, separating into long, shaggy plates which are loose at one or both ends.

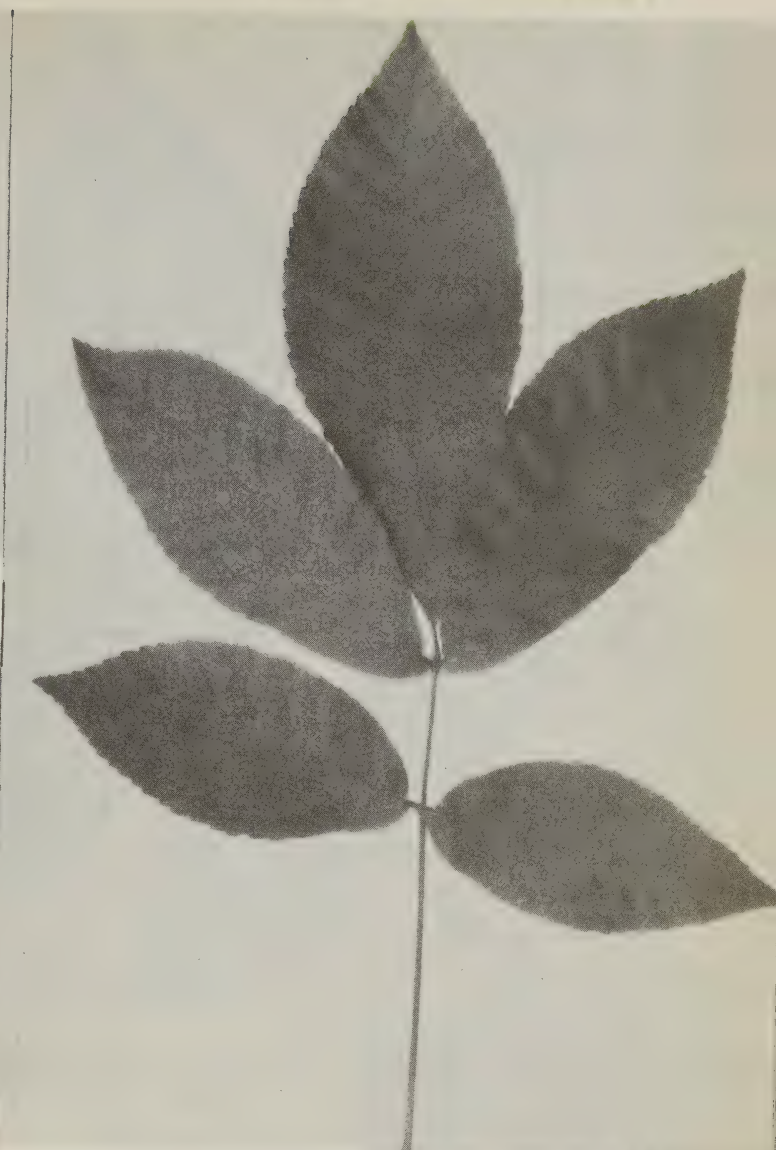
WOOD—Heavy, hard, tough, strong, fine-grained, ring-porous; reddish-brown with whitish sapwood.

The wood of the shagbark hickory is used in Canada for vehicle stock, spokes, tool handles, machinery parts, and sporting goods. This is the tree that produces the hickory nut of commerce.

SHAGBARK HICKORY



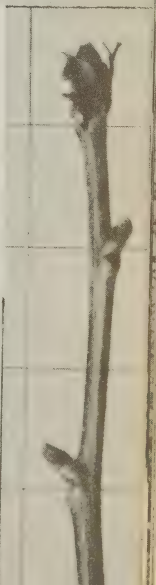
NUTS, NATURAL SIZE



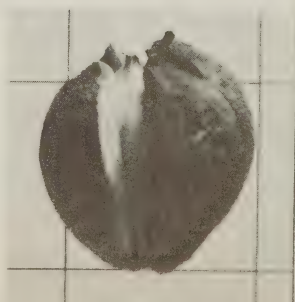
COMPOUND LEAF

MATURE
SHAGGY
BARK

WINTER TWIG



SPLITTING
HUSK



THE HICKORIES

PIGNUT HICKORY

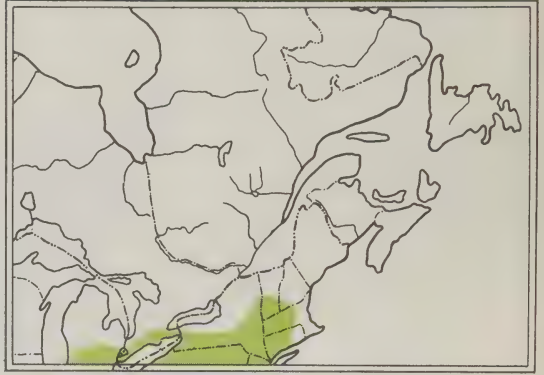
Carya glabra (Mill.) Sweet

Brown hickory, black hickory.

The pignut hickory is usually a medium-sized tree 40 to 60 feet in height and 1 to 3 feet in diameter. When grown in the forest, it develops a tall, straight, slightly tapering trunk with a crown of short, spreading branches. In the open the trunk is much shorter, and the crown is very narrow, and the branches extend well down the trunk. The branches are frequently much twisted and contorted, with the tips and the lower ones hanging toward the ground.

In Canada it is confined to the Niagara Peninsula and the region bordering on Lake Erie. It is chiefly an upland species with a strong preference for dry soils on ridges and hillsides, where it grows in open mixtures of oak, hickory, ash, and cherry. It is rather intolerant of shade.

The nuts vary greatly in size and shape. They are usually pear-shaped but some are oval. Others, again, are perfectly round or broader than long. The small kernel may be either bitter or sweet. The husk splits only half-way to the base and, as a rule, falls off the tree with the nut.



LEAVES—Alternate, compound, 8 to 12 inches long, composed of 3 to 7 (usually 5) leaflets borne in pairs on a slender stem. Leaflets lance-shaped, sharp-pointed, fine-toothed, 3 to 6 inches long; dark yellow-green above, paler, often hairy on the main vein, below.

FLOWERS—May-June, after the leaves; unisexual, both sexes on the same twig; male in slender, greenish catkins, female in short spikes.

FRUIT—Early autumn; a rounded, thick-shelled, brownish-white, slightly flattened nut enclosed in a thin reddish-brown husk, about 1 inch long.

TWIGS—Moderately slender, shiny, grey to reddish-brown. Terminal bud oval, blunt, reddish-brown, smooth or covered with down, $1/5$ to $1/2$ inch long; larger than the lateral buds.

BARK—Thin, grey at first; becoming dark grey, shallow-fissured into narrow ridges.

WOOD—Heavy, hard, tough, strong, close-grained, ring-porous; light brown with almost white sapwood.

The wood of the pignut is similar to that of the other hickories, and is used for vehicle stock, spokes, tool handles, machinery parts, and sporting goods.

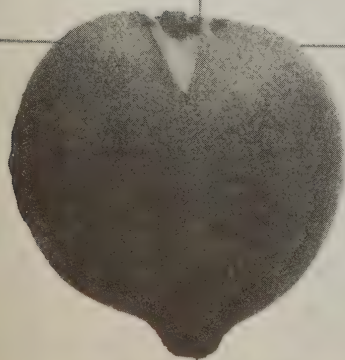
PIGNUT HICKORY



COMPOUND LEAF,
ONE-HALF SIZE

MATURE BARK

FRUIT



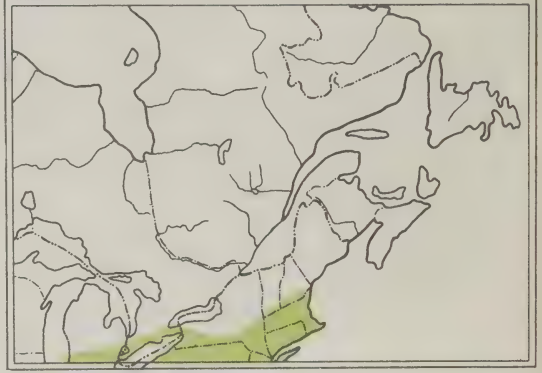
THE HICKORIES

MOCKERNUT HICKORY

Carya tomentosa Nutt.

Whiteheart hickory, bigbud hickory.

The mockernut hickory is a tall, slender tree 75 to 90 feet in height when growing on a good site in the forest, with a trunk up to 2½ feet in diameter. The trunk is straight and free from branches for about half its length. When growing in the open, it is a much shorter tree with a broad, round-topped crown.



The mockernut is a comparatively rare tree in Canada, where it is limited to that part of Ontario bordering on Lake St. Clair, Lake Erie, and Lake Ontario. It is found growing on a wide variety of soils, but does best on rich, well-drained slopes. It requires considerable moisture and will not thrive in a shaded situation.

The nut is large, but its shell—thickest of all the hickories—is so thick that, when opened, the small size of the kernel is disappointing.

The name mockernut probably comes from the early New York Dutch "moker-noot", meaning heavy-hammer nut.

LEAVES—Alternate, compound, 8 to 12 inches long, composed of 7 to 9 (rarely 5) leaflets borne in pairs on a stout, grooved, hairy stem. Leaflets, usually lance-shaped, sharp-pointed, toothed, 3 to 8 inches long, resinous; dark shiny green above, paler and hairy below; very fragrant when crushed.

FLOWERS—May-June, after the leaves; unisexual; male in slender, hairy, yellowish-green catkins, female in short greenish spikes, both on the same twig.

FRUIT—Autumn; a rounded, somewhat flattened, thick-shelled, reddish-brown, sweet, edible nut enclosed in a thick, reddish-brown husk, up to 2 inches long.

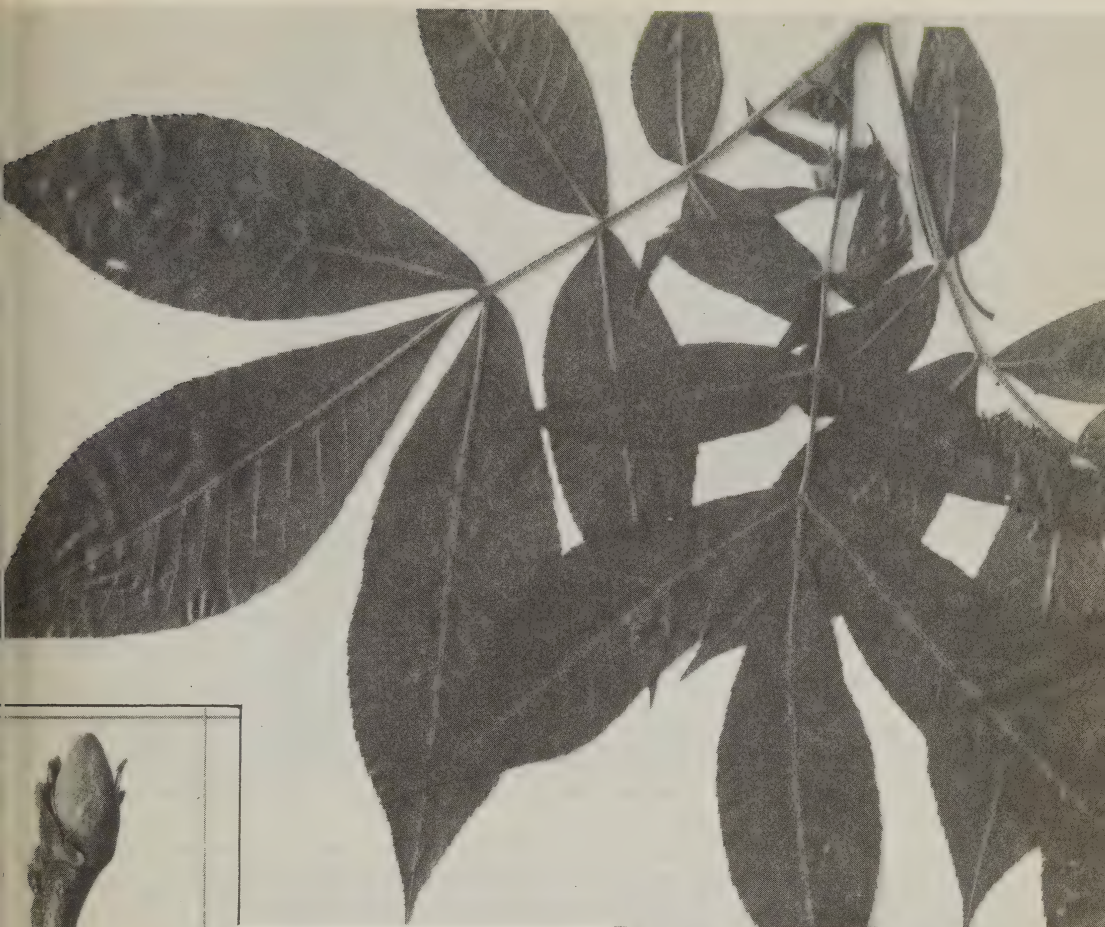
TWIGS—Stout hairy, reddish-brown. Terminal bud ½ to ¾ of an inch long, hairy, the dark reddish-brown outer scales soon falling and exposing the paler, silky, inner scales; lateral buds much smaller.

BARK—Thin, dark grey, roughened by shallow furrows into narrow, flat ridges, more or less scaly.

WOOD—Very heavy, hard, tough, strong, ring-porous; dark brown with thick, almost white, sapwood.

The wood of this species is often considered to be superior to that of the other hickories but is rarely sold separately. It is used for machinery parts, vehicle stock, tool handles, and sporting goods. The nuts are sometimes sold on local markets.

MOCKERNUT HICKORY

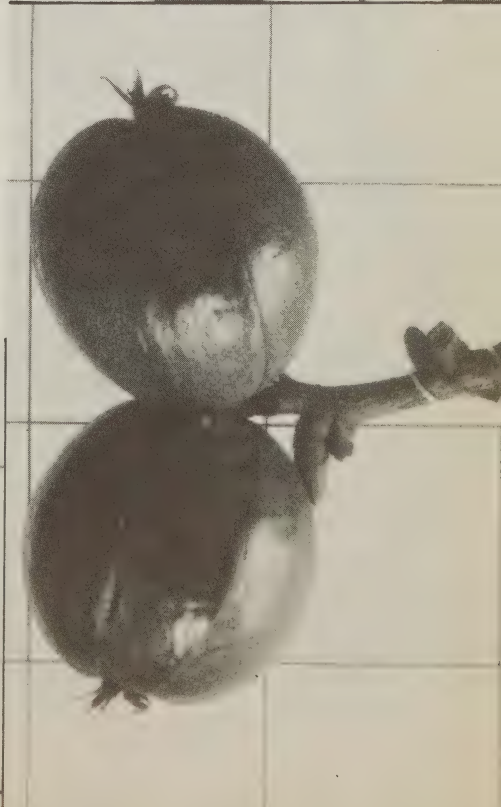
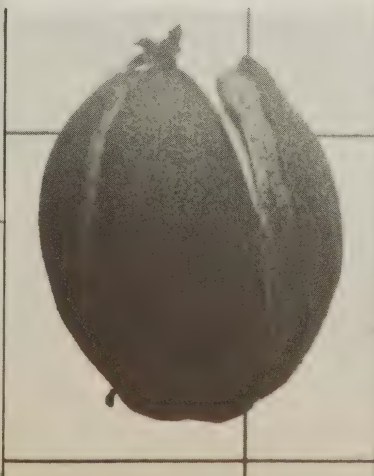
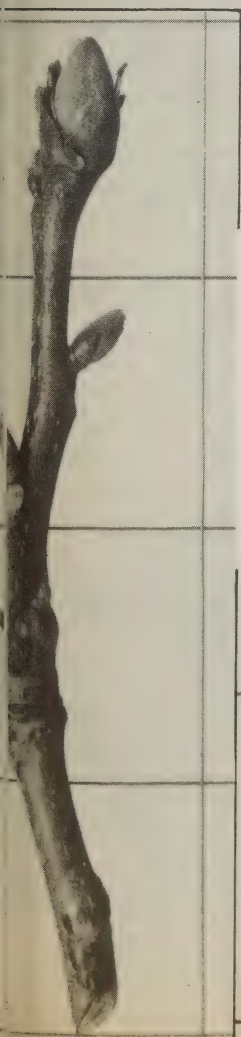


COMPOUND LEAVES,
ONE-HALF SIZE

◀ WINTER TWIG

FRUIT ▶

SPLITTING HUSK



THE BLUE BEECHES

BLUE - BEECH

Carpinus caroliniana Walt.
var. *virginiana* (Marsh.) Fern.

Water beech, ironwood, smooth-bark ironwood,
hornbeam, hop-hornbeam.

This variety of the blue beech is the only form found in Canada. It is a small, often bushy, tree or large shrub rarely more than 15 to 20 feet in height and 4 to 10 inches in diameter. It is frequently an unshapely tree with a short, crooked, often leaning, trunk, which is often ridged or fluted. The branch system is usually flattened on top, and is composed of long branches of irregular growth and many fine, supple twigs which are arranged in flat spreading sprays.

The blue-beech is common throughout the hardwood region of southern Quebec and southern Ontario to the north shore of Georgian Bay. It prefers the borders of streams and swamps, usually on a deep moist soil where it grows singly and in thickets in the under-story to other hardwood species. It is rarely found growing in direct sunlight.

This tree is not a true beech, but derives its name from the fact that its bark resembles that of a beech. The fluted trunk, winter buds, leaves, and fruit are quite different, and a comparison of any of these would enable the 2 species to be distinguished.

About 26 species of *Carpinus* L. are known, of which the blue beech is the only one native to this continent.



LEAVES—Alternate, simple, oval in outline, long-pointed, double-toothed with sharp, slender teeth; 2 to 4 inches long; blue-green above, pale green and sometimes with small tufts of whitish hair in the axils of the veins, below.

FLOWERS—April-May; unisexual; the male appearing before the leaves from large buds on lateral twigs, the female with the leaves, both sexes on the same twig.

FRUIT—September; a small nut, borne at the base of a three-lobed, toothed, leaf-like bract; the bracts 1 to 1½ inches long, borne in clusters on a slender stem.

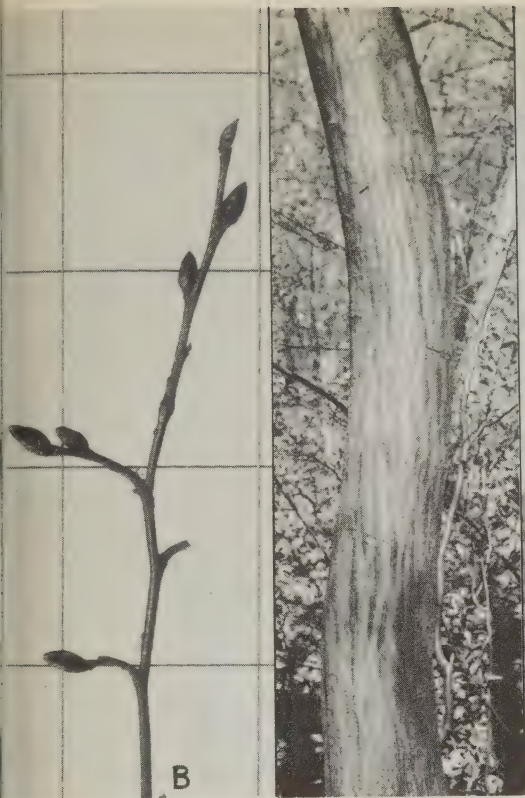
TWIGS—Very slender, tough, shiny, reddish-brown. No terminal bud, lateral buds slightly hairy, reddish-brown, sharp-pointed, about 1/8 of an inch long. Male flower buds larger, rounded.

BARK—Thin, smooth, bluish-grey.

WOOD—Very heavy, hard, strong, fine-grained, diffuse-porous; brownish-white with almost white sapwood.

The wood is used locally because of its hardness and toughness, but the tree does not reach a size to make it commercially important.

BLUE-BEECH



WINTER TWIGS
LEAF BUDS (A)
FLOWER BUDS (B)

BARK

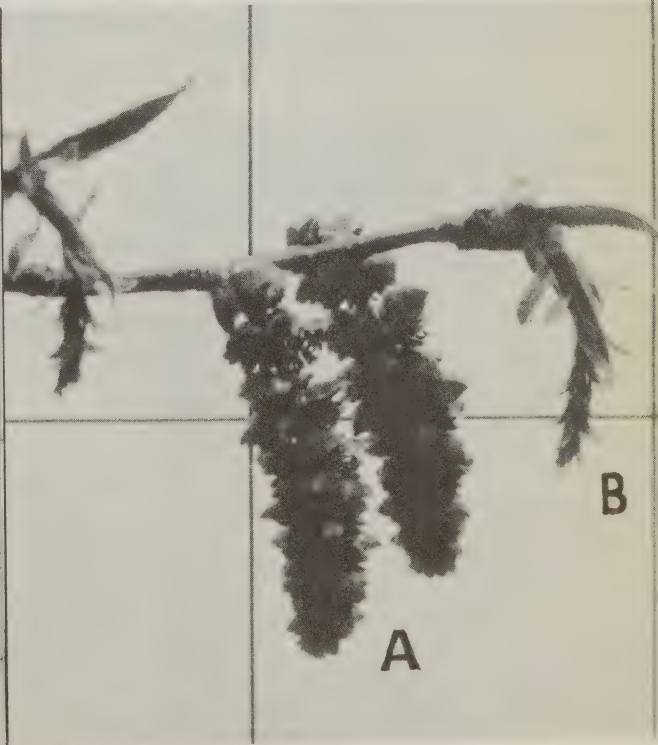


LEAVES



LOBED BRACT

FRUIT CLUSTER



MALE (A) AND FEMALE (B) FLOWERS

IRONWOOD

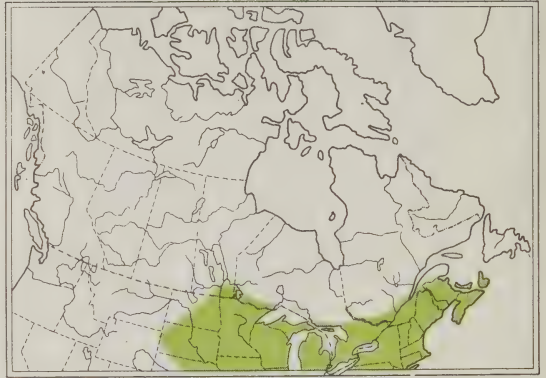
Ostrya virginiana (Mill.) K. Koch

Rough-barked ironwood, hornbeam, hop hornbeam.

The ironwood, or hop hornbeam as it is sometimes called, is a small tree commonly 25 to 35 feet in height and 6 to 10 inches in diameter on average sites. On the best sites it may reach a height of 60 feet and a diameter of 2 feet. The trunk is slender, nearly always erect, and usually extends to the top of the tree. The crown of tough, slender branches is broad and round-topped in the open, narrow and cone-shaped in dense stands.

This tree is found from Cape Breton Island to southeastern Manitoba, except in the region directly north of Lake Superior. It prefers rich, well-drained, loamy slopes and ridges and is seldom found in pure stands. It is very tolerant of shade and commonly occurs as an understory tree in mixtures of beech, sugar maple, yellow birch, white ash, and basswood. Usually the young branchlets, leaf stems, and the veins on the lower surfaces of the expanding leaves, bear tiny stalked glands. These glands provide a good means of identification.

Three of the 7 recognized species of *Ostrya* Scop. are found in North America; of these only one occurs in Canada. The others are found in southern Europe and in Asia.



LEAVES—Alternate, simple, oval in outline, sharp-pointed, fine, double-toothed, thin, $2\frac{1}{2}$ to 5 inches long; dark yellow-green above, paler below with tufts of pale hairs in the angles of the veins.

FLOWERS—April-May; unisexual; in greenish catkins, the male formed the preceding autumn, the female appearing with the leaves; both sexes on the same twig.

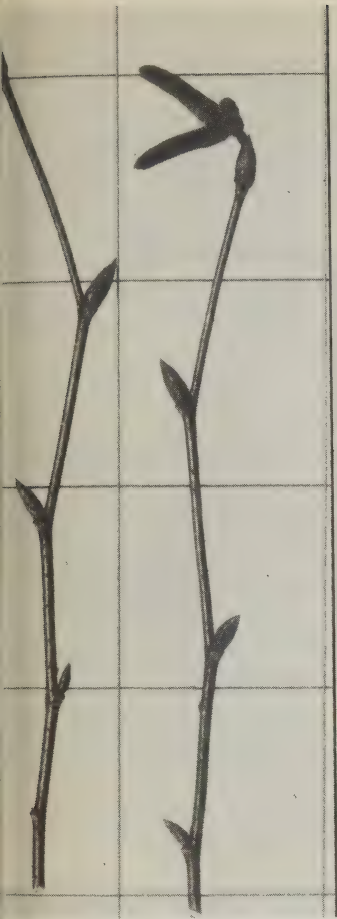
FRUIT—September; a small, greenish nut, enclosed in an oval, bristly, papery sac; borne in dense elongated clusters on a slender stem.

TWIGS—Very slender, tough, shiny, dark reddish-brown. No terminal bud; lateral buds sharp-pointed, slightly hairy, chestnut-brown, about $\frac{1}{4}$ of an inch long.

BARK—Light brown, soon roughened by narrow, elongated, shreddy scales which loosen at the ends.

WOOD—Very heavy, hard and tough, close-grained, diffuse-porous; light brown with almost white sapwood.

The ironwood produces one of the hardest and toughest of native woods and is used locally for vehicle stock, tool handles, and spring-poles. As it is usually available in small sizes only, it is not important as a lumber producer.



WINTER TWIGS

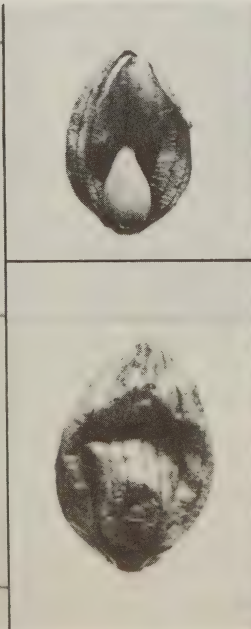


LEAVES AND FRUIT

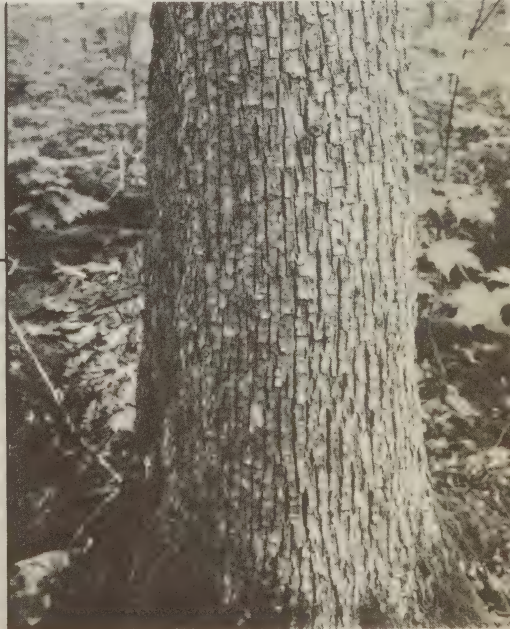
EXPOSED NUT



MALE FLOWERS



PAPERY FRUIT SAC



MATURE BARK

The BIRCHES *Betula* L.

The 30 to 40 recognized species of birch are found chiefly in the temperate zones of the Old and New Worlds. They range in size from tiny, matted, shrubby growth to large forest trees over 100 feet in height. Seven tree species and about the same number of shrubby species occur naturally in Canada.

The bark of most birch trees is marked with long, horizontal lenticels, and on young trees can often be separated into thin, papery layers. On old trunks it is sometimes rough and broken into irregular sections. The presence of numerous short, spur-like projections on the branchlets is a distinctive feature. There is no terminal bud on the tips of the twigs. The leaves are deciduous, coarse, often double-toothed, and alternate in their arrangement along the twigs; on the older twigs as well as on the spur shoots each bud usually produces a pair of leaves.

The unisexual male and female flowers appear in the spring, the male in tassel-like catkins on the tips of the twigs, the female in spike-like catkins below them and on the spur shoots. The male catkins are formed in the autumn, but do not reach their full size until the following spring. The birches produce their seed in small catkin-like cones composed of three-lobed scales. These mature in one season and disintegrate when the seed, a tiny nut bordered by a pair of thin wings, is released.

Four of the Canadian tree birches are eastern species, 2 are western and 1, the white birch (a variable species represented in Canada by the type and 7 varieties), ranges from Newfoundland to Alaska. Two of the eastern species, the yellow and wire birches, are distributed from the Maritime Provinces to Ontario. Another, the sweet birch, has been reported from Nova Scotia to Ontario, but the only authentic specimens are from western Quebec and eastern and southern Ontario. The fourth eastern species, blueleaf birch, *Betula caerulea-grandis* Blanch., is a small tree found from Nova Scotia and Prince Edward Island to Montmorency County in Quebec. It is distinguished by its lustrous whitish bark, nearly triangular leaves, smooth on both sides and toothed almost to the stems, and ascending cone scales with diverging lateral lobes.

One of the western species, the water birch, is a large shrub or small tree distributed from northern Ontario to British Columbia and the Yukon. The second, the Kenai birch, *Betula kenaica* Evans, has been reported recently by Porsild from southeast Yukon.

Only 2 foreign birches are planted to any extent in Canada. The European white or silver birch, *Betula pendula* Roth, is a medium-sized tree with lustrous whitish bark and very slender, usually drooping, branchlets. The leaves resemble those of the wire birch. The second introduced species, *Betula alba* L., (*Betula pubescens* Ehrh.), resembles our native white birch in many ways, but can be distinguished by its smaller leaves, and very resinous buds.



CONE SCALE,
ENLARGED 6 TIMES



NUT, ENLARGED 6 TIMES
BLUELEAF BIRCH



LEAF ENLARGED

CONES, ENLARGED

THE BIRCHES

YELLOW BIRCH

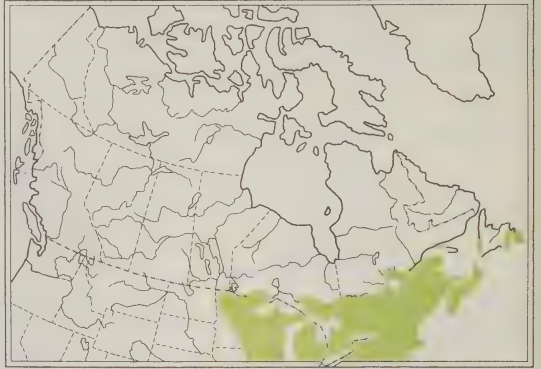
Betula lutea Michx. f.

Curly birch, hard birch, black birch, tall birch, gold birch, red birch, silver birch.

The yellow birch is the largest of our native birches and sometimes reaches a height of 100 feet and a diameter of 3 or 4 feet. The average tree is 60 to 75 feet high and 2 feet in diameter. In the forest the trunk is long and straight, has a small amount of taper, and supports a short, relatively narrow crown. In the open the branch system is wide, but the central stem is still fairly well defined. The root system is moderately deep on all but the shallowest of soils; it consists of several strong, wide-spreading lateral roots.

This birch is found from the Maritime Provinces and southern Newfoundland to Lake Superior and beyond along the International Boundary; it is also reported from southern Manitoba. It grows on a wide range of sites from rich, moist bottom-lands to the drier soils of hilltops and ridges. Its more important associates are white spruce, red spruce, eastern hemlock, balsam fir, beech, sugar maple, and red maple.

Yellow birch takes its name from its yellowish bark. On a young tree it is smooth, but as the tree ages the bark peels into papery curls. On very old trees it may become almost black and broken into flat plates.



LEAVES—Alternate, simple, oval in outline, sharp-pointed, coarse-double-toothed, 2 to 4½ inches long; dark green above, yellow-green below.

FLOWERS—April-May; unisexual; borne in greenish catkins, male clustered, formed the preceding autumn, female solitary, appearing before the leaves.

FRUIT—Autumn; a tiny 2-winged nut, about as broad as the wings; borne in a stout, erect cone, 1 to 1½ inches long, sometimes persisting on the tree over winter. Cone scales hairy, with ascending lobes.

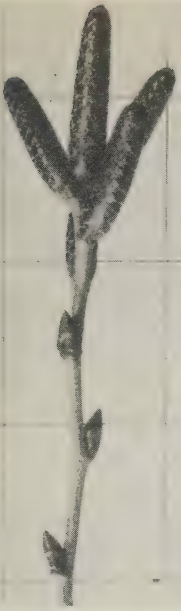
TWIGS—Slender, smooth or hairy, yellowish-brown to reddish-brown, with a strong wintergreen taste. No terminal bud; lateral buds sharp-pointed, slightly hairy, chestnut-brown, about ¼ of an inch long.

BARK—At first thin, smooth, yellowish-brown; soon separating into thin, papery curls; on very old trunks thick, reddish-brown to almost black, and broken into large, flat plates.

WOOD—Heavy, hard, moderately strong, fine-grained, diffuse-porous; brown to reddish-brown with whitish sapwood.

This is the most important hardwood tree in Eastern Canada. The wood is used extensively for flooring, furniture, plywood, veneer, vehicle stock, and railway ties.

YELLOW BIRCH



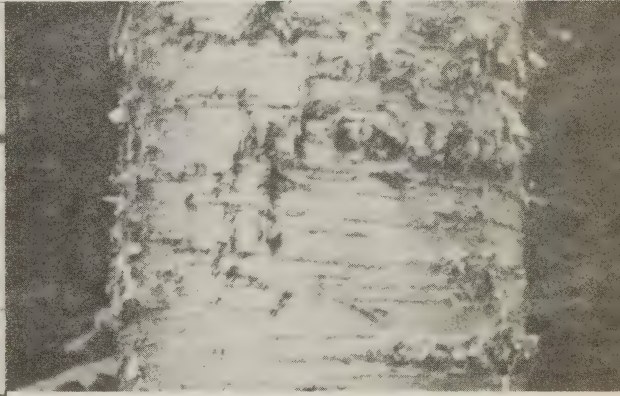
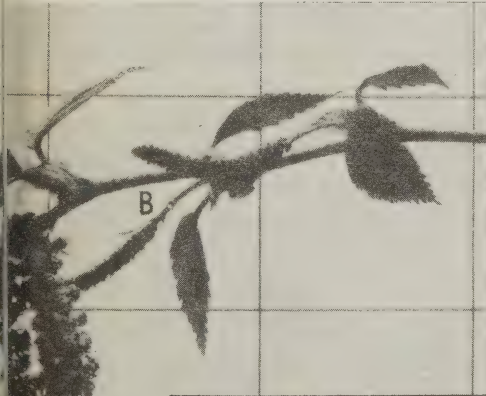
WINTER TWIGS



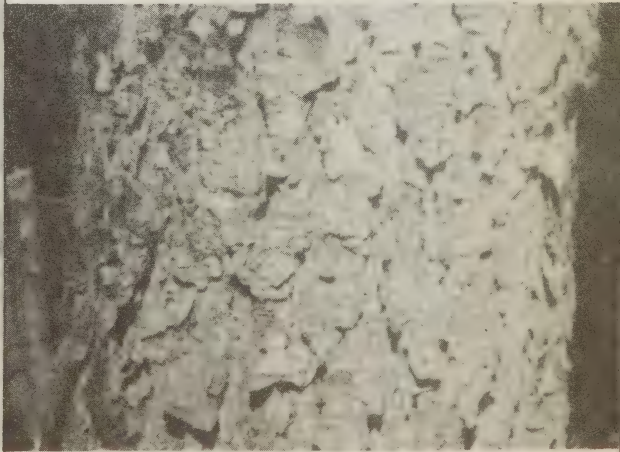
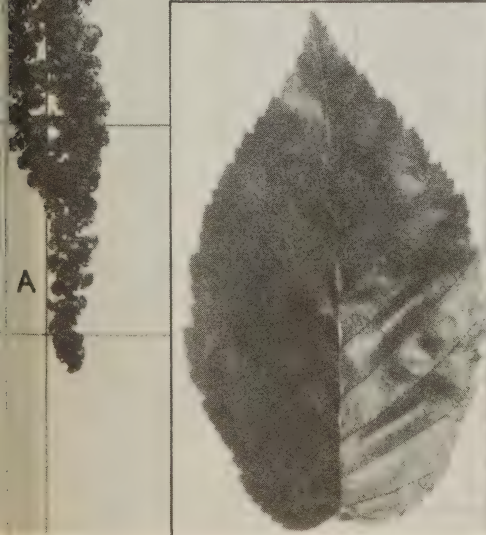
CONE SCALES, NUTS,
TWICE NATURAL SIZE



LEAVES AND CONES



CURLY YELLOW BARK



OLD PLATED BARK

LEAF

LEAF (A) AND
CATKIN (B)
NUTS

SWEET BIRCH

Betula lenta L.

Black birch, red birch, cherry birch.

The sweet birch is a medium-sized tree about 50 feet high with a diameter averaging 1½ to 2 feet, but occasionally reaching a height of 75 feet and a diameter of 4 feet. On very poor soil it is apt to be shrub-like with a stunted appearance. The branches, although numerous and spreading out from the stem at a rather wide angle, present a rather narrow outline. The twigs and smaller branches droop at the ends. The roots are deep and wide-spreading.

The range of this species in Canada is not well known. It has been reported from Nova Scotia to western Ontario, but so far the only authentic collections have been made in southern and eastern Ontario, and in southwestern Quebec. It is probable, therefore, that sweet birch is limited to a small area in eastern Ontario and southwestern Quebec. It prefers deep, rich soil in cool situations, where it grows scattered among other hardwoods. It never forms pure stands.

The sweet birch is frequently confused with the yellow birch, but can be distinguished by its fine-toothed (rarely double-toothed) leaves with scalloped or heart-shaped bases, and by the blackish bark, which does not peel into curly bands.



LEAVES—Alternate, simple, oval in outline, sharp-pointed, usually heart-shaped at the base, fine-toothed, 2½ to 6 inches long; dull dark green above, paler below.

FLOWERS—April-May; unisexual; in catkins, male clustered, formed the preceding autumn, female solitary, appearing with the leaves; both sexes on the same twig.

FRUIT—Autumn; a tiny, 2-winged nut, a little broader than its wings; borne in a stout, erect cone, 1 to 1½ inches long, the scales smooth or slightly hairy; shed late in the autumn.

TWIGS—Slender, shiny, light reddish-brown, with a strong wintergreen taste. No terminal bud; lateral buds shiny, sharp-pointed, chestnut brown, about ¼ of an inch long.

BARK—On young stems smooth, shiny, dark reddish brown to almost black; on old trunks almost black, broken into large, irregular plates.

WOOD—Heavy, hard, moderately strong, straight-grained, diffuse-porous; brown to reddish-brown with paler sapwood.

The wood of this species is not separated commercially from that of yellow birch, and is also used for flooring, furniture, plywood, veneer, and vehicle stock. Because of its limited range, it is of little economic importance in Canada.

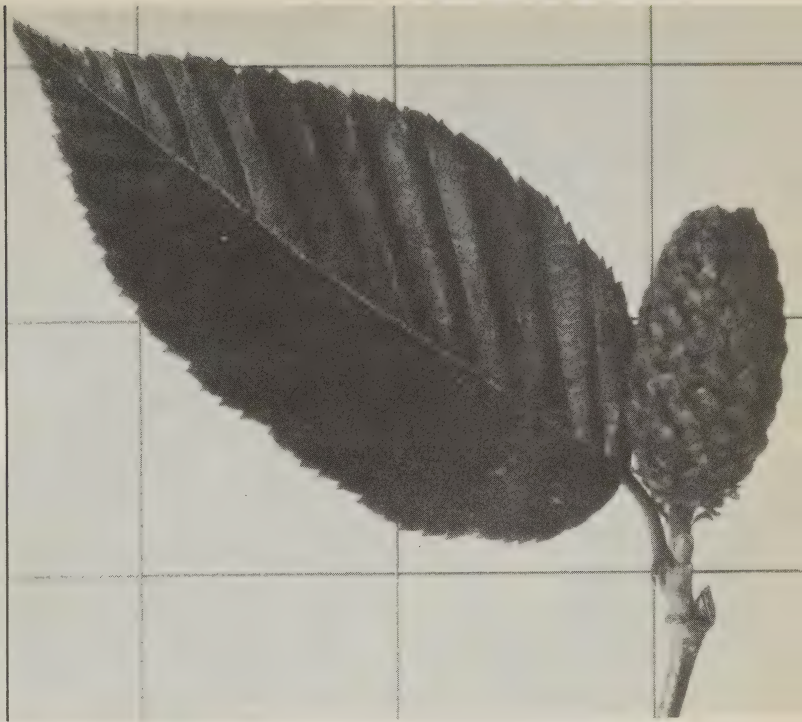
SWEET BIRCH



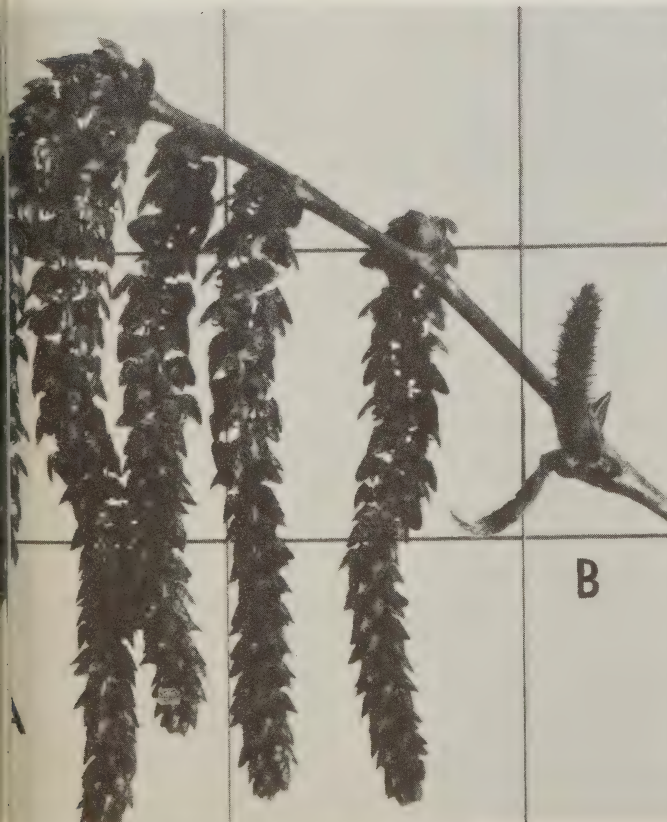
CONE SCALE,
ENLARGED 4 TIMES



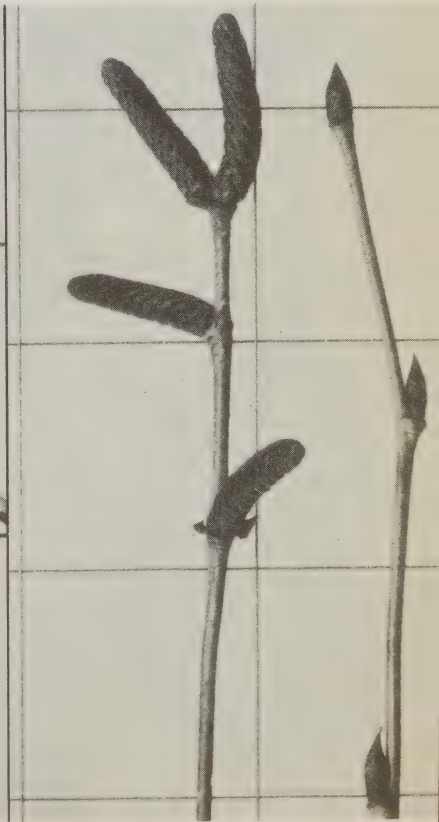
CONE SCALE,
ENLARGED 4 TIMES



LEAF AND CONE



MALE (A) AND FEMALE (B) FLOWERS



WINTER TWIGS

THE BIRCHES

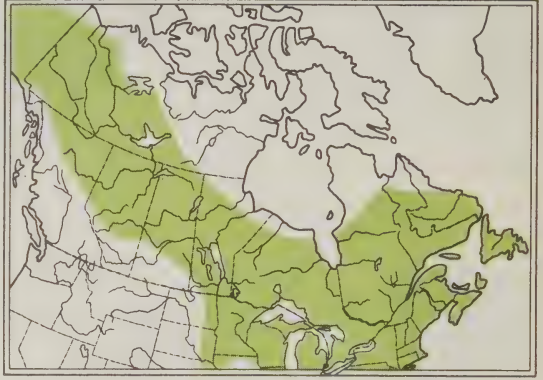
WHITE BIRCH

Betula papyrifera Marsh.

Birch, paper birch, canoe birch, silver birch.

The white birch or one of its varieties is found in nearly every part of Canada from the Atlantic Coast to Alaska. The type is a medium-sized tree rarely over 80 feet in height or 2 feet in diameter. In the forest the trunk is long and clear, often leaning and crooked, but in the open it is short, and the crown is large, irregular, and composed of many stout limbs and ascending branches. The shiny, creamy to pinkish-white, tough, easily split, papery bark is a characteristic feature. The root system is usually rather shallow.

The mountain white birch, var. *cordifolia* (Regel) Fern., is distinguished from the type by its heart-shaped leaves and larger cone scales with ascending lateral lobes. It ranges from Nova Scotia and Labrador to Western Ontario. The weeping white birch, var. *pensilis* Fern., found from Nova Scotia to Quebec is distinguished by the drooping habit of its branches and the abundant cones which are usually arranged in clusters of 2 to 4. A small northwestern tree, the Alaska white birch, var. *humilis* (Regel) Fern. and Raup, ranging from Saskatchewan to British Columbia and northward to Alaska and the mouth of the Mackenzie River, has whitish to reddish-brown bark and small, triangular leaves. Varieties *macrostachya* Fern. and *elobata* Fern. are confined to Eastern Canada.



LEAVES—Alternate, simple, mostly oval in outline (var. *cordifolia* heart-shaped, var. *humilis* nearly triangular) coarse and double-toothed, 1½ to 4 inches long; dark green and smooth above, paler and more or less hairy below.

FLOWERS—April-May, in unisexual catkins, the male formed the preceding autumn, the female appearing with the leaves, both on the same twig.

FRUIT—Autumn, a tiny, two-winged nut, narrower than its wings; borne in a drooping cone, the scales with diverging lateral lobes (vars. *cordifolia* and *macrostachya* ascending, var. *elobata* not at all or only slightly lobed) usually shed at maturity.

TWIGS—Moderately stout, hairy at first, becoming smooth, shiny, reddish-brown, speckled with whitish lenticels; no terminal bud; laterals sharp-pointed, about ¼ of an inch long, chestnut brown, slightly resinous, the scales slightly downy.

BARK—Thin, smooth, at first dark brown, soon becoming shiny creamy-white to pinkish-white (var. *cordifolia* creamy-white to warm brown, var. *humilis* white to reddish-brown), easily separated into papery layers.

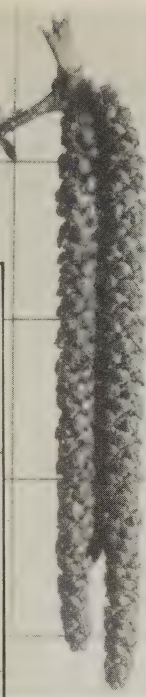
WOOD—Moderately hard, heavy, and strong, straight-grained, diffuse-porous; light reddish-brown with nearly white sapwood.

The wood may be sawn into lumber, and large quantities are used for fuelwood, but its industrial uses are chiefly restricted to spoolwood, plywood, and small turnery.

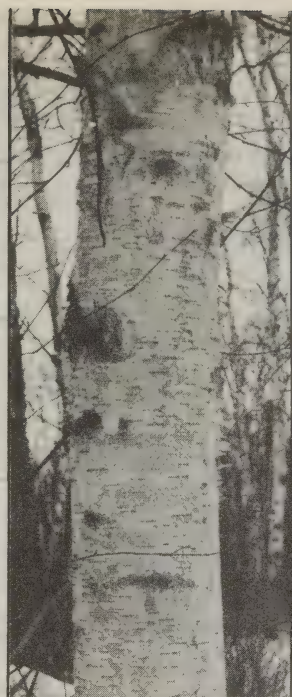
WHITE BIRCH



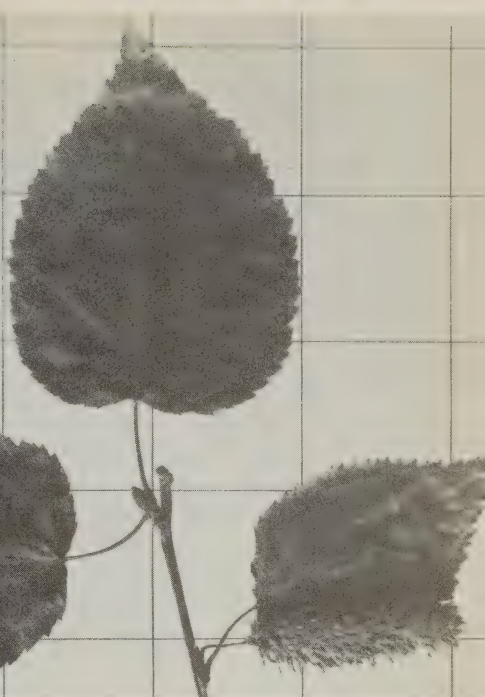
CONE



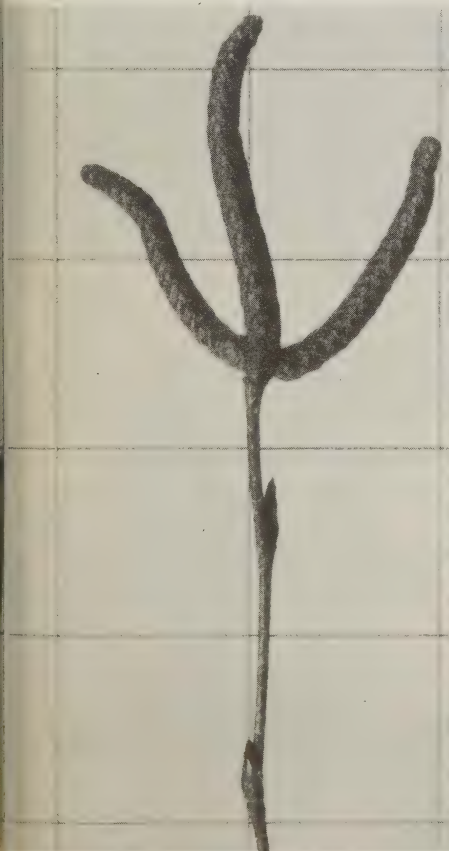
FEMALE AND
MALE
FLOWERS



WHITISH
PAPERY
BARK



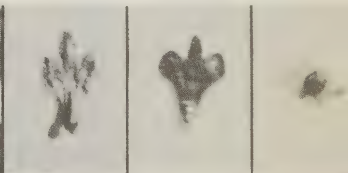
MOUNTAIN WHITE BIRCH
LEAVES AND CONE



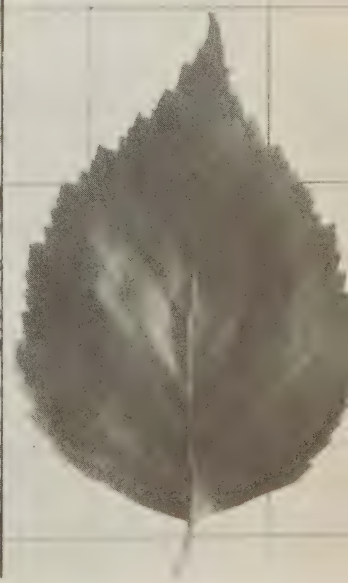
WINTER TWIGS



MOUNTAIN WHITE BIRCH
BROWN BARK



CONE SCALE CONE SCALE NU
MOUNTAIN WHITE BIRCH



LEAF

THE BIRCHES

WESTERN WHITE BIRCH

Betula papyrifera Marsh.
var. *commutata* (Regel) Fern.

**Birch, western birch, British Columbia birch,
black birch, white birch.**

The western white birch and its close relative, the northwestern white birch, *Betula papyrifera* Marsh. var. *subcordata* (Rydb.) Sarg., are the only white birches in southern British Columbia. The first sometimes reaches heights of 100 feet or more and diameters of 3 or 4 feet, with comparatively slender branches forming a compact rounded crown. The bark on young trunks is smooth, brown, and shiny. On old trunks the outer layers may peel off, exposing the creamy-white or orange-coloured bark. The name western white birch is misleading, as this tree grows in both Eastern and Western Canada. In the east it ranges from Labrador to Nova Scotia, mainly near the Atlantic Coast and about the Gulf of St. Lawrence, and around James Bay, particularly on the Ontario side; in the west it has been found at Churchill, and from Saskatchewan to the Pacific Coast.

The northwestern white birch is a smaller tree, rarely more than 60 feet in height and 18 inches in diameter, with orange-brown to silver-grey bark tinged with purple, reddish brown twigs, and small, usually slightly heart-shaped leaves which are seldom more than $2\frac{1}{2}$ inches long. It ranges from the Cypress Hills, Jasper, and Crows Nest Pass in Alberta westward throughout southern British Columbia.



LEAVES—Alternate, simple, broadly oval in outline (var. *subcordata* usually slightly heart-shaped), sharp-pointed, coarse and double-toothed, $2\frac{1}{2}$ to 3 inches long (var. *subcordata* seldom more than $2\frac{1}{2}$ inches long); dark green above, paler and slightly hairy below.

FLOWERS—Spring; in unisexual catkins; the male formed the preceding autumn, the female appearing with the leaves, both on the same twig.

FRUIT—Autumn; a tiny two-winged nut, slightly narrower than its wings; borne in a stout, drooping cone, 1 to $1\frac{1}{2}$ inches long, the scales hairy with spreading lateral lobes; shed at maturity.

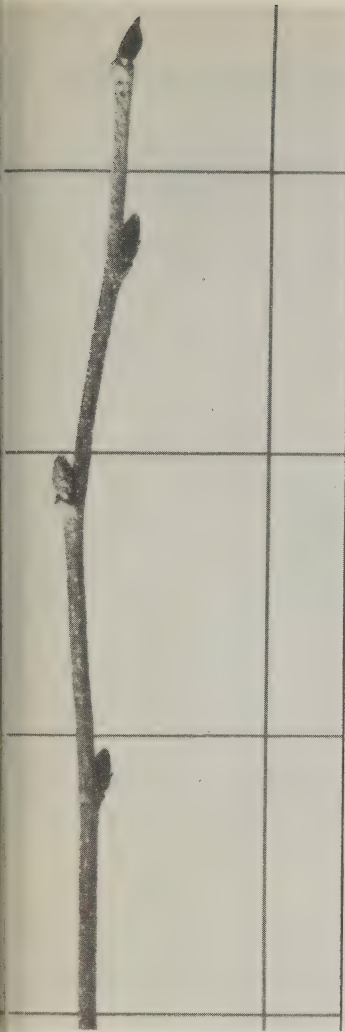
TWIGS—Slender, at first hairy, becoming smooth, shiny, orange-brown; (var. *subcordata* reddish-brown). No terminal bud; lateral buds sharp-pointed, $\frac{1}{8}$ to $\frac{1}{4}$ of an inch long, bright orange-brown.

BARK—Thin, easily separated into papery layers, shiny, orange-brown to nearly white, inner bark creamy-white to orange-yellow.

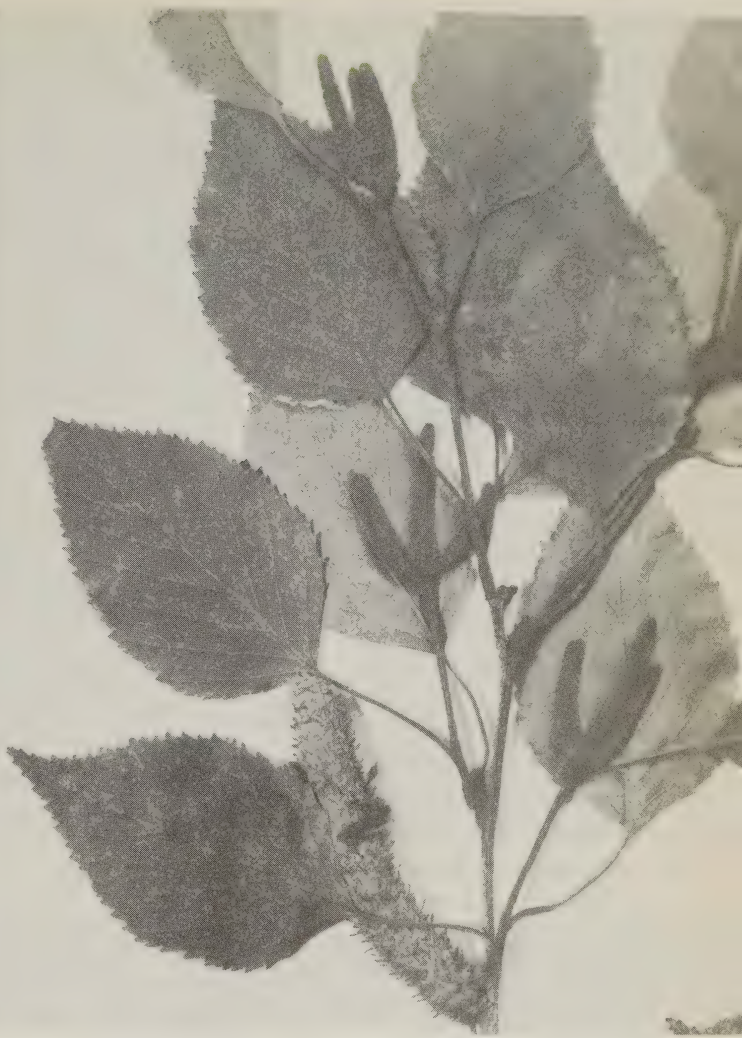
WOOD—Light, moderately hard and strong, fine-textured, diffuse-porous; light reddish-brown with white sapwood.

This tree is used for furniture, flooring, plywood, and small turnery.

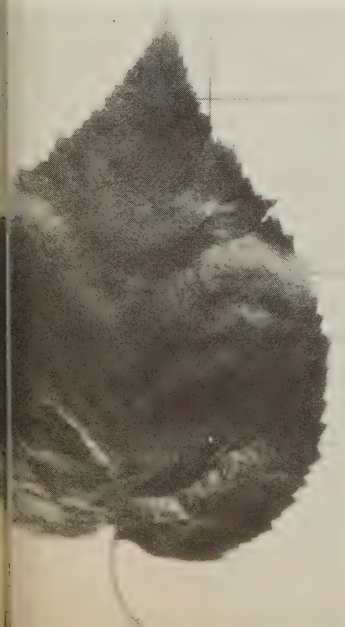
WESTERN WHITE BIRCH



WINTER TWIG



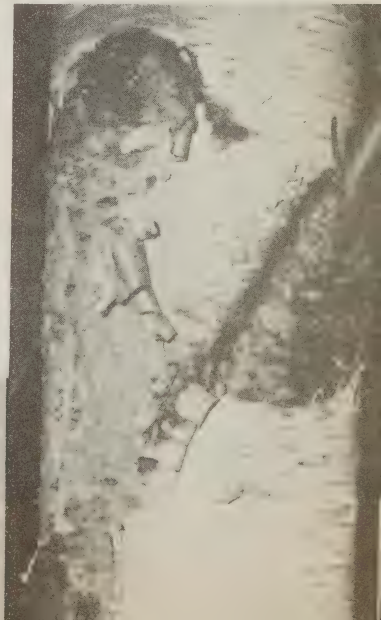
LEAVES, CONE, AND MALE CATKINS



LEAF, NORTHWESTERN
WHITE BIRCH

BARK

CONE SCALE NUT
ACTUAL SIZE



THE BIRCHES

WIRE BIRCH

Betula populifolia Marsh.

Grey birch, white birch, water birch, swamp birch, poplar-leaved birch.

The wire birch is a small tree, rarely over 30 to 35 feet in height and 6 inches in diameter. The trunk is slender and usually extends undivided to the top of the open, pyramidal crown. The branches are slender, and divide into many fine, flexible branchlets that have a tendency to droop. On the trunk beneath each branch is a triangular black spot that is characteristic of the tree. The roots are moderately deep and spreading.

This birch ranges from the Maritime Provinces to eastern Ontario. It is usually found on dry gravelly or sandy soils and is often one of the first trees to spring up after a forest fire. Occasionally it is found on wet soils along the margins of streams and swamps. It is short-lived, rarely exceeding 50 years of age.

Throughout the eastern portion of its range this species is frequently confused with the blueleaf birch, *Betula caerulea-grandis* Blanch. The latter is most easily distinguished by its shiny, creamy or pinkish-white bark; its nearly triangular leaves, smooth on both sides, rounded at the base and toothed almost to the stem; and cones 1 to 2 inches long, their scales ascending, their lateral lobes diverging.



LEAVES—Alternate, simple, triangular in outline, coarse and double-toothed, 2 to 3 inches long; dark green and shiny above, paler below.

FLOWERS—April-May; unisexual, in separate catkins on the same twig; male usually solitary, formed the preceding autumn, female solitary, appearing with the leaves.

FRUIT—Autumn; a tiny, two-winged nut, slightly narrower than its wings; borne in a drooping or semi-erect cone, about $\frac{3}{4}$ of an inch long, the scales hairy, set nearly at right angles to the cone axis, with broad diverging lateral lobes; shed at maturity.

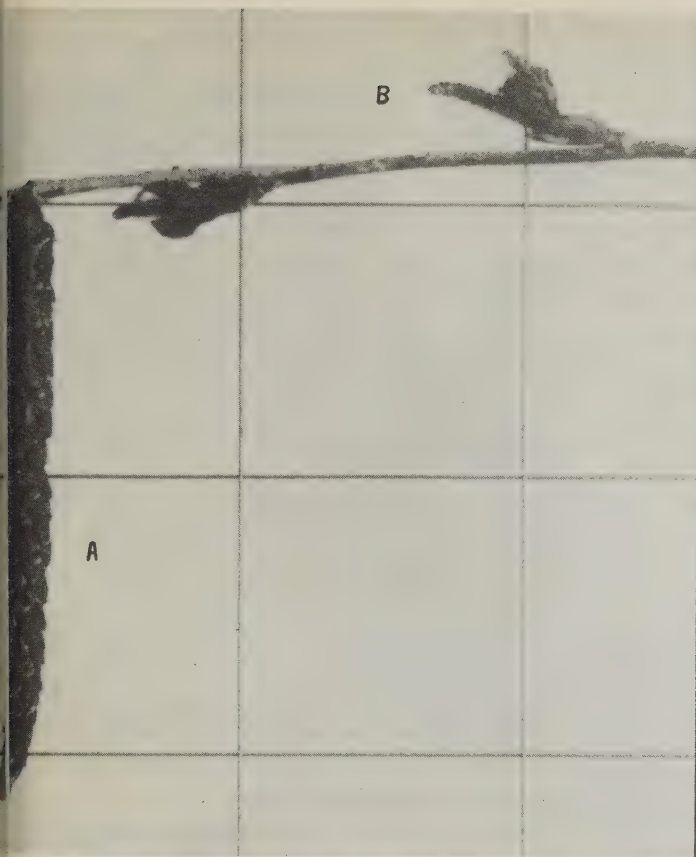
TWIGS—Very slender, shiny, reddish-brown, thickly covered with whitish, wart-like glands. No terminal bud; lateral buds sharp-pointed, somewhat resinous, chestnut-brown, about $\frac{1}{4}$ of an inch long.

BARK—At first dark reddish-brown; becoming dull chalky white, or almost black at the base of old trees; does not peel easily.

WOOD—Light, soft, not strong, fine-textured, diffuse-porous; light reddish-brown with paler sapwood.

As this tree rarely reaches commercial size in Canada its wood is seldom used, except locally for fuelwood and barrel hoops.

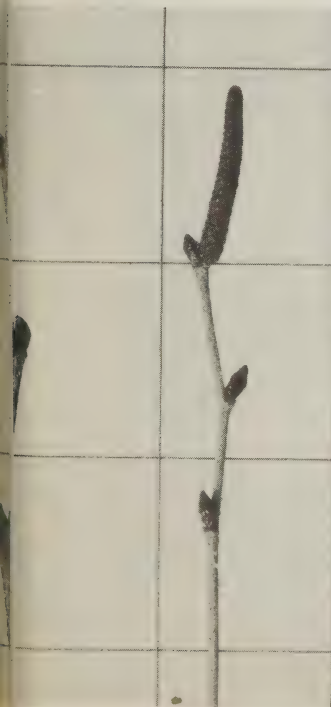
WIRE BIRCH



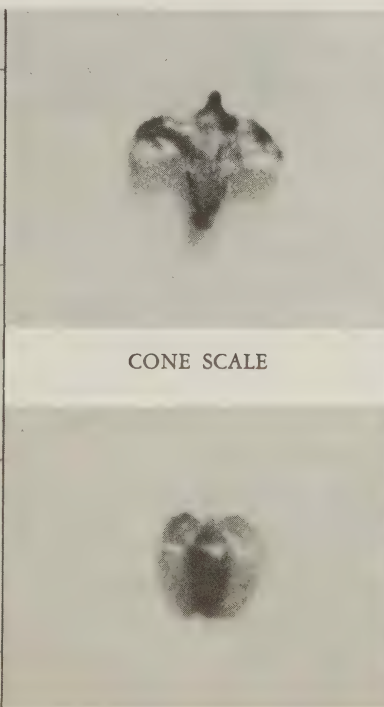
MALE (A) AND FEMALE (B) FLOWERS



LEAF AND FRUIT (CONE)



WINTER TWIGS



CONE SCALE

NUT



CHALKY-WHITE BARK

THE BIRCHES

WATER BIRCH

Betula occidentalis Hook.

Mountain birch, red birch, black birch.

The water birch is one of the smallest tree birches. It is commonly a tall shrub or shrub-like tree 10 to 20 feet in height, growing in clumps with all stems rising from the same root system. Occasionally, on the best of sites, it may reach a height of 35 feet or more and diameters up to 14 inches. The crown of small, spreading, or ascending branches, and very slender, usually drooping, branchlets is narrow and open.

This tree is distributed from the lower reaches of the Albany and Attawapiskat Rivers on James Bay in Ontario, westward to the east slopes of the Cascade Mountains in British Columbia, and northward into Keewatin, Mackenzie and the Yukon. It is found chiefly on moist soils along streams and around springs, where it forms dense, pure thickets or is associated with alders, cottonwoods, willows, and other moisture-loving species. It is rarely found on a dry site.

Water birch is easily separated from the other western birches by its shiny, dark red bark that does not peel easily or separate into thin layers.



LEAVES—Alternate, simple, broad oval in outline, blunt to sharp-pointed, sharp and often double-toothed, $\frac{3}{4}$ to $2\frac{1}{2}$ inches long; dull dark green, smooth above, pale yellow-green, shiny, minutely dotted below.

FLOWERS—May-June; unisexual; male catkins clustered, formed the preceding autumn, female solitary, appearing with the leaves; both on the same twig.

FRUIT—Autumn; a tiny, two-winged nut, almost as wide as its wings; borne in a stout, erect or drooping cone, 1 to $1\frac{1}{4}$ inches long; the scales hairy, sharp-pointed, the lateral lobes ascending, shorter than the middle lobe.

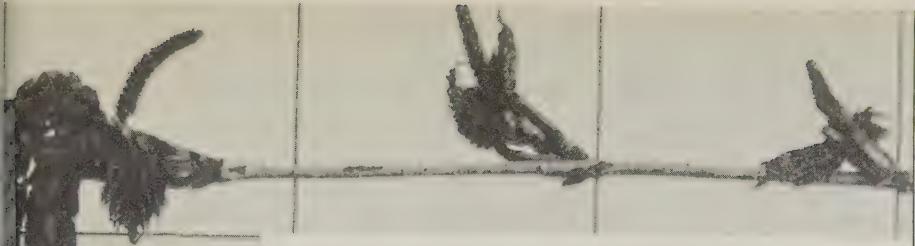
TWIGS—Very slender; at first green, becoming reddish-brown, covered with resinous glands. No terminal bud; lateral buds sharp-pointed, resinous, brownish, about $\frac{1}{4}$ of an inch long.

BARK—Thin, shiny, dark red-brown, marked with long, brownish lenticels.

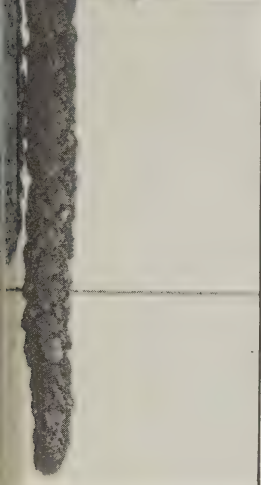
WOOD—Light, soft, weak, diffuse-porous; light brown with paler sapwood.

Water birch is of little commercial importance. It is sometimes used locally for fuelwood and fence posts.

WATER BIRCH



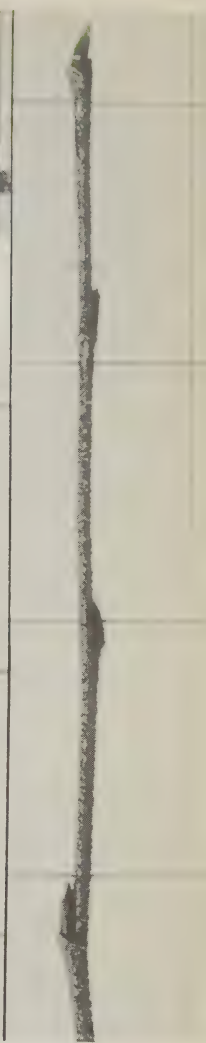
FEMALE FLOWERS



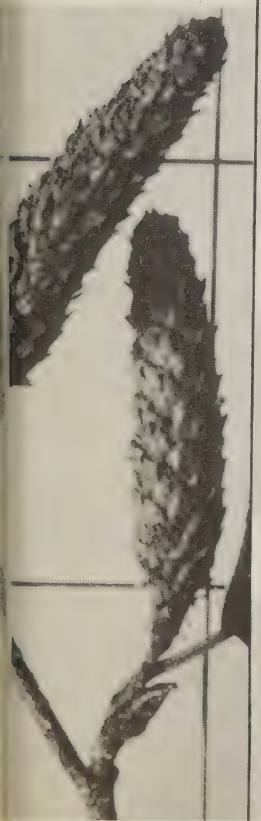
MALE FLOWERS



LEAVES



WINTER TWIG



CONES



NUT

CONE SCALE



PREFORMED
MALE CATKINS

The ALDERS *Alnus* B. Ehrh.

About 30 species of alder are recognized. They are widely distributed throughout the temperate and cooler regions of North America, also in parts of South America, Europe, and Asia. A few of them attain tree size, but for the most part they are shrubs growing along the banks of streams and on wet slopes. Five of the 7 native species, the red, white, Sitka, and mountain alders of the west, and the speckled alder of the east sometimes reach tree size. The sixth and seventh Canadian species, the green alder, *Alnus crispa* (Ait.) Pursh, and the smooth alder, *Alnus serrulata* (Ait.) Willd. var. *vulgaris* Spach, are shrubs.

All the Canadian tree alders resemble one another in having astringent bark and scaly winter buds, which are stalked or raised on more or less well-defined stems. All have terminal buds. The witch-hazel also has a stalked bud, but it is without scales and is covered with a dense coat of yellowish-brown hair.

Alder leaves are alternate, simple, more or less sharp-toothed, often slightly lobed or wavy-edged, and are shed while still green. The flowers are unisexual, both sexes being borne in catkins on the same twig, the male in clusters at the tip, the female lower down. They usually emerge from the buds in the late summer and then either remain dormant over winter and complete their development in the spring or are fully formed by the end of February. The fruit, a tiny, flattened, winged or wingless nut is borne in a persistent, semi-woody cone. It matures in one season and is shed soon afterwards.

The wood of the alders is of secondary economic importance. Only 2 species, the red and the white alder, reach commercial sizes in Canada. The others are occasionally used locally for fuelwood.

The black alder, *Alnus glutinosa* (L.) Gaertn., a native of Europe and Asia, is planted occasionally. It is a tree up to 40 or 50 feet in height with shiny, dark green coarse-toothed leaves, which are rounded or slightly notched at the tip. The cones are about twice as large as those of the speckled alder.



RED ALDER AT COWICHAN LAKE, BRITISH COLUMBIA

SPECKLED ALDER

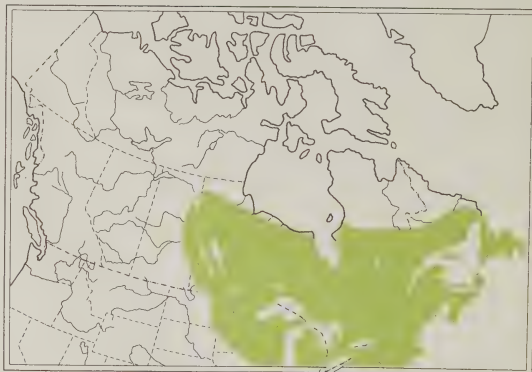
Alnus rugosa (Du Roi) Spreng.
var. *americana* (Regel) Fern.

Grey alder, hoary alder, alder.

Throughout the greater part of its range, the speckled alder is a low, crooked, often declining shrub, 6 to 15 feet high and 3 or 4 inches in diameter, growing in clumps of many stems which branch off close to the ground. Occasionally it becomes a small tree 35 to 45 feet in height and 8 inches in diameter. The fibrous roots rarely penetrate far into the ground.

It occurs from the Atlantic Coast westward to Saskatchewan, and is commonly found in thickets along streams, around lakes, in swamps, and on areas subject to spring flooding. Best growth is made on a wet, but well-drained, sandy or gravelly soil. It is not tolerant of shade.

The type form of this species is the swamp alder, *Alnus rugosa*, of the Eastern United States. It is found in Canada only in western Nova Scotia. It is nearly always a shrub and is distinguished from the speckled alder by its leaves, which are greenish beneath. Those of the speckled alder are covered below with a whitish bloom. These 2 alders are sometimes confused with the green alder but are separated from that species by their distinctly stalked buds and almost wingless seeds. In contrast, the buds of the green alder are not stalked and the seeds are conspicuously winged.



LEAVES—Alternate, simple, broad oval in outline, sharp-pointed, usually double-toothed, 1½ to 4 inches long; dull dark green, conspicuously veined above, smooth or hairy, covered with a whitish bloom below.

FLOWERS—March-May; unisexual; in clustered, reddish-brown catkins, formed the preceding autumn and opening before the leaves; both sexes on the same twig.

FRUIT—Autumn; a tiny, two-winged nut, wider than its very narrow wings; borne in a stout, nearly black cone ¼ to ½ inch long; shed at maturity.

TWIGS—Slender, greyish-brown, slightly hairy. Terminal bud reddish-brown, usually downy, distinctly stalked, about 1/3 of an inch long; lateral buds similar.

BARK—Smooth, greyish-brown with conspicuous, whitish lenticels.

WOOD—Light, soft, weak, diffuse-porous; pale brown, turning red on exposure to the air.

The wood, although sometimes used for fuel-wood, has no commercial value. However, the tree does serve a useful purpose in checking the rush of water during spring floods.

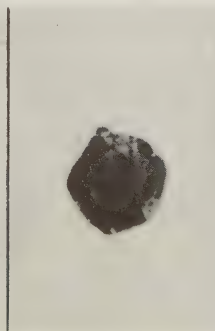
SPECKLED ALDER



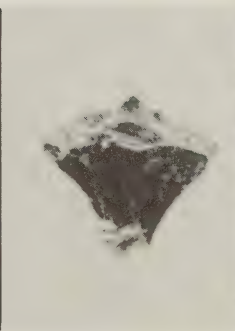
TWIGS, WINTER BUDS, OPENED CONES,
PREFORMED MALE AND FEMALE FLOWERS



LEAF



FRUIT (NUT)



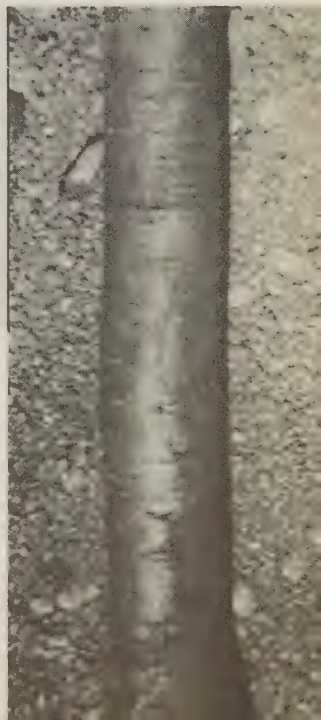
CONE SCALE

ENLARGED FOUR TIMES

MALE AND
FEMALE FLOWERS



BARK



RED ALDER

Alnus rubra Bong.

Oregon alder, western alder.

The red alder is the largest alder growing in Canada, frequently 40 feet in height and 1 foot in diameter, but larger trees up to 80 feet in height and 2 feet in diameter are known. The trunk is straight and usually clear of branches for much of its length. The crown of slim, often drooping, branches is narrow and dome-shaped. The roots are usually shallow and spreading.

In Canada, this alder is confined to British Columbia, mostly to the pacific region. It has, however, been reported from several localities in the Interior. It requires moist, rich, well-drained, gravelly or rocky soils for good growth, and is common along streams, on bottomlands, and on gentle slopes. It frequently invades recent clear-cut areas and old burns. It occurs in pure stands and in association with Douglas fir, Sitka spruce, western yew, the western white birches, black cottonwood, and broadleaf maple. It is tolerant of competition when young but becomes less so with age.



LEAVES—Alternate, simple, oval in outline, blunt, shallow-lobed, toothed with short rounded teeth, 3 to 5 inches long; dull dark green above, paler, often coated with rusty hairs below.

FLOWERS—Spring, opening before the leaves; unisexual; in clustered catkins formed the preceding autumn; male and female on the same twig.

FRUIT—Autumn; a tiny, two-winged nut, wider than its very narrow, sometimes encircling wings, borne in a stout, persistent cone $\frac{1}{2}$ to 1 inch long; shed at maturity.

TWIGS—Slender, shiny, often hairy, bright red. Terminal bud distinctly stalked, dark red, downy, about $\frac{1}{3}$ of an inch long; lateral buds similar.

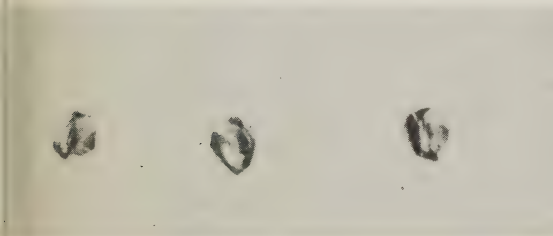
BARK—Thin, smooth or roughened by small swellings, light grey to almost white; sometimes on old trunks marked by conspicuous black patches and broken into narrow ridges.

WOOD—Light, soft, brittle, fine-textured, diffuse-porous; pale brown changing to reddish-brown on exposure.

The wood is light in weight, and has a fine uniform texture which takes paint and enamel finishes very well. Its uniform qualities also render it suitable for turnery and core-stock. It is easily worked, nails readily, has a pleasing appearance when finished, and is used for furniture, cabinet-work, woodenware, and novelties.



MALE FLOWERS AND WINTER BUDS



NUTS, ENLARGED



LEAF



OPEN CONES



CLOSED CONES

CONE SCALES,
ENLARGED

WHITE ALDER

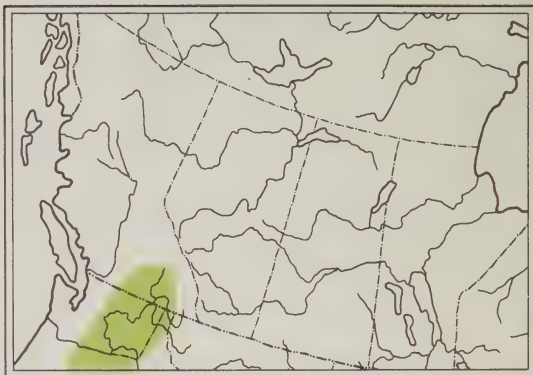
Alnus rhombifolia Nutt.

Alder, mountain alder.

The white alder very nearly approaches the red alder in size. It frequently attains a height of 40 feet, and under very favourable conditions may exceed 70 feet. The trunk is straight and usually clear of branches for $\frac{1}{2}$ or more of its length. The broad crown is rather open and is formed of long, slender branches which frequently droop at the ends.

The white alder is a very rare tree in Canada. It has been reported only in the interior region of southern British Columbia, between the Coast Range and the Selkirk Mountains. It inhabits canyon bottoms and the banks of streams, usually on moist, gravelly, or rocky sites. It occurs in pure stands and mixed with other moisture-loving species.

The white alder can be readily distinguished from the other tree alders native to the same region by its leaves, which are usually wavy-edged, and its habit of flowering in the winter.



LEAVES—Alternate, simple, oval in outline, rounded or short-pointed, toothed, usually wavy-edged, 2 to 3 inches long; shiny dark green above, yellow-green, minutely hairy below.

FLOWERS—January-February, unisexual, in clustered, hairy catkins; male formed early in the autumn and beginning to open before the leaves drop; female appearing in December; both on the same twig.

FRUIT—Midsummer; a tiny nut, bordered by a thin, hard, very narrow wing; borne in a stout cone, $\frac{1}{3}$ to $\frac{7}{8}$ of an inch long, opening the following winter.

TWIGS—Slender, light green and hairy at first, becoming smooth, dark orange-red. Terminal bud slender, stalked, bright red, hairy, about $\frac{1}{2}$ inch long, similar to the lateral buds.

BARK—Greyish on young stems; dark brown, scaly, often ridged on old trunks.

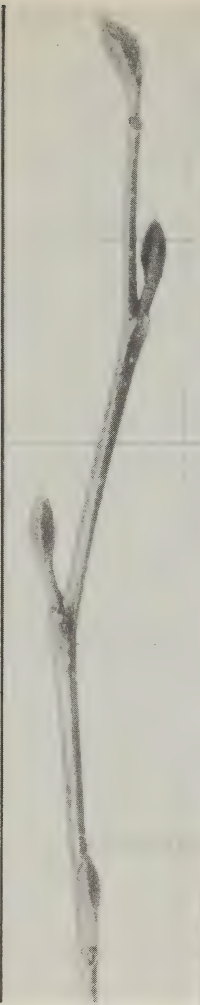
WOOD—Light, soft, brittle, fine-textured, diffuse-porous; light brown with whitish sapwood.

This tree is of no commercial importance in Canada. The wood is similar to that of the red alder, and farther south where the tree is more abundant it is sawn into lumber and used for turnery and core-stock, furniture, cabinet-work, woodenware and novelties.

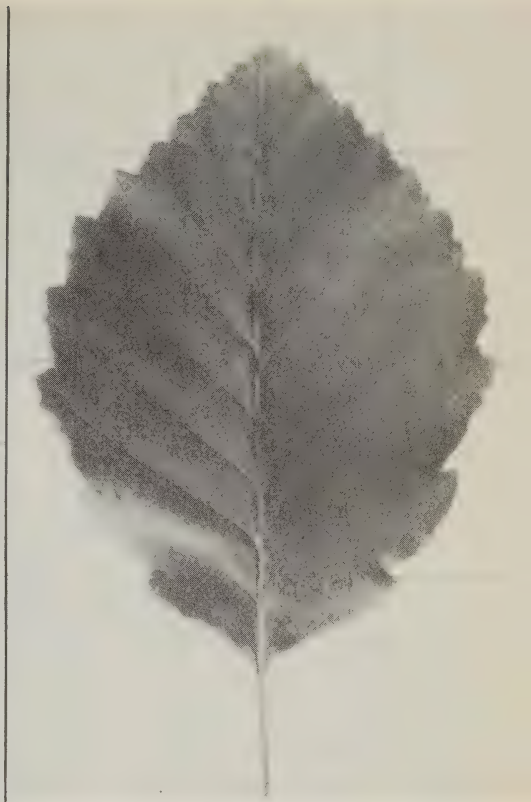
WHITE ALDER



PREFORMED MALE AND
FEMALE FLOWERS



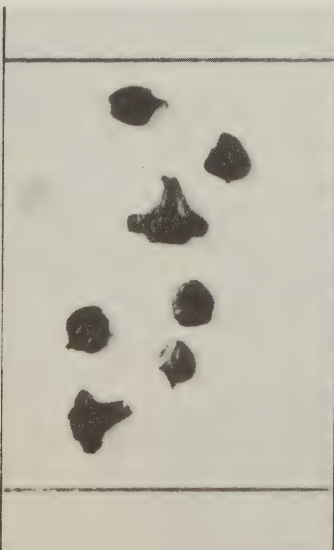
WINTER
TWIG



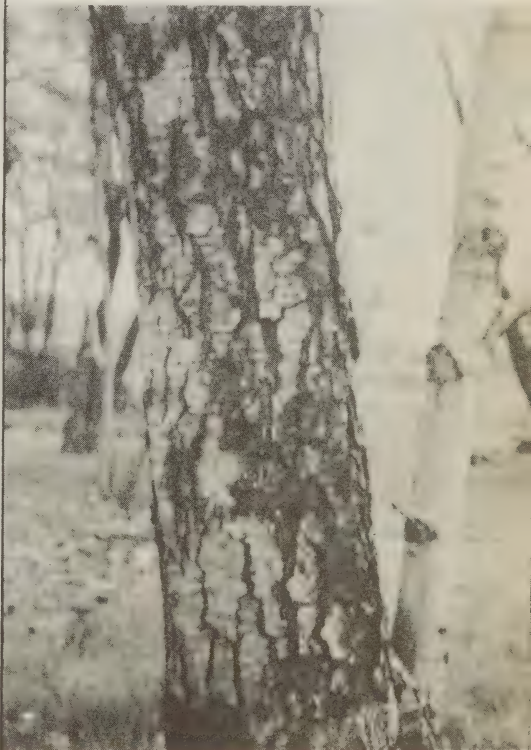
LEAF



CLOSED CONES



NUTS AND CONE SCALES



MATURE BARK

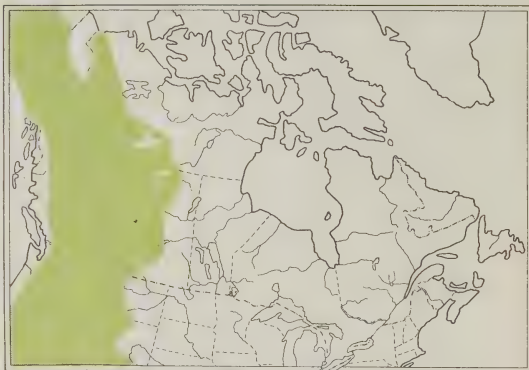
MOUNTAIN ALDER

Alnus tenuifolia Nutt.

Thinleaf alder.

The mountain alder received its name because of its high mountain habitat, by which it is ordinarily distinguished. It is usually only a slender shrub growing in dense thickets, but sometimes becomes a small, crooked tree 20 to 25 feet in height and up to 6 inches in diameter. It forms a narrow, round-topped crown of slender, often drooping branches.

This alder is found from Alaska and the mouth of the Mackenzie River, southward throughout central British Columbia, and eastward to Prince Albert and Saskatoon in Saskatchewan. It is commonly found on wet, but well-drained, usually rocky soils along the banks of mountain streams and gulches, on wet slopes, and around high mountain meadows and lakes. It is relatively intolerant of competition and is therefore rarely found growing with other tree species.



LEAVES—Alternate, simple, oval to oblong in outline, short-pointed, usually shallow-lobed, coarse and double-toothed, 2 to 4 inches long; dull dark green above, yellow-green, often hairy below.

FLOWERS—Early spring, before the leaves; unisexual; in clustered catkins formed the preceding autumn, male and female on the same twig.

FRUIT—Autumn; a tiny two-winged nut, much wider than its very narrow wings; borne in a stout, persistent cone $\frac{1}{3}$ to $\frac{5}{8}$ of an inch long; shed at maturity.

TWIGS—Slender, hairy at first, pale brown to grey. Terminal bud distinctly stalked, bright red, minutely hairy $\frac{1}{4}$ to $\frac{1}{3}$ of an inch long, similar to the lateral buds.

BARK—Thin, smooth, grey-brown on young stems; thin, scaly reddish-brown on old trunks.

WOOD—Light, soft, weak, diffuse-porous; light brown.

Mountain alder is of no commercial importance. It does, however, provide considerable protection against erosion on the banks and headwaters of mountain streams.

LEAVES



LEAVES,
PREFORMED
MALE
FLOWERS
AND
OPENED
CONES



SITKA ALDER

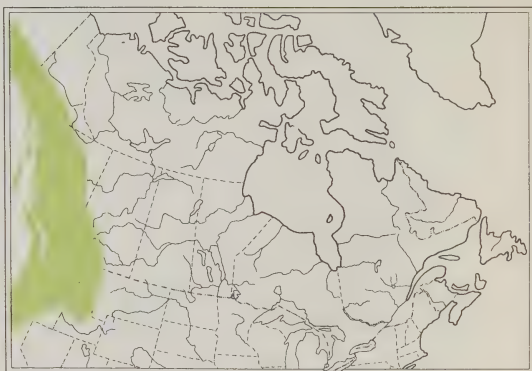
Alnus sinuata (Regel) Rydb.

Green alder, northern alder, mountain alder.

The Sitka alder is usually a shrub, but sometimes becomes a small tree 30 to 40 feet in height and 8 inches in diameter. It develops a slender, often crooked, trunk, and a narrow, open crown of short, nearly straight, horizontal branches.

The Sitka alder grows from Alaska and Yukon southward, along the Pacific Coast and the Rocky Mountains in British Columbia, to Colorado and northern California in the United States. It has also been reported as occurring along the east slope of the Rockies in Alberta. It is frequently a tree in the northwestern part of its range, where it grows on moist bottoms and marshy flats with the willows and balsam poplar. Farther south it is found in thickets along streams, around alpine meadows, and on the borders of swamps, generally at elevations of 3,000 feet and up.

Some botanists classify this tree as a subspecies of the shrubby green alder. The botanical name then becomes *Alnus crispa* (Ait.) Pursh subsp. *sinuata* (Regel) Hulten.



LEAVES—Alternate, simple, oval in outline, sharp-pointed, shallow-lobed, double-toothed, very sticky when young, thin, 3 to 6 inches long; bright yellow-green above, paler, shiny, smooth or slightly hairy along the veins below.

FLOWERS—Early spring, with the leaves; unisexual; in clustered catkins; male formed the preceding autumn, female enclosed in buds during the winter; both on the same twig.

FRUIT—Autumn; a tiny, two-winged nut, about as wide as its wings; borne in a stout cone $\frac{1}{3}$ to $\frac{3}{4}$ of an inch long; shed at maturity.

TWIGS—Slender, shiny, minutely hairy, yellowish-brown. Terminal bud stalked, dark purple, downy, about $\frac{1}{2}$ inch long, similar to the lateral buds.

BARK—Thin, smooth, light grey with a bluish tinge.

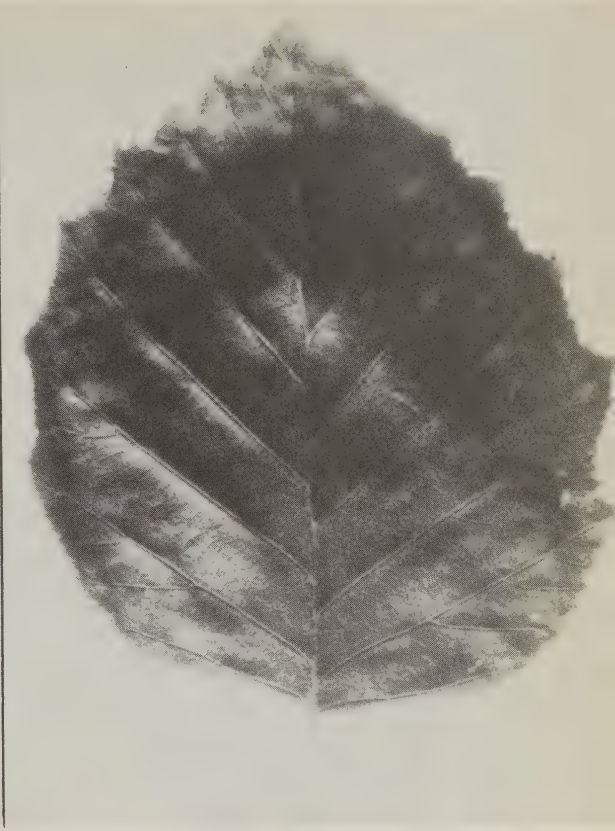
WOOD—Light, soft, brittle, diffuse-porous; light brown with whitish sapwood.

The wood of this species is used locally for fuelwood and occasionally for lumber. The tree is also useful in preventing erosion and controlling stream flow.

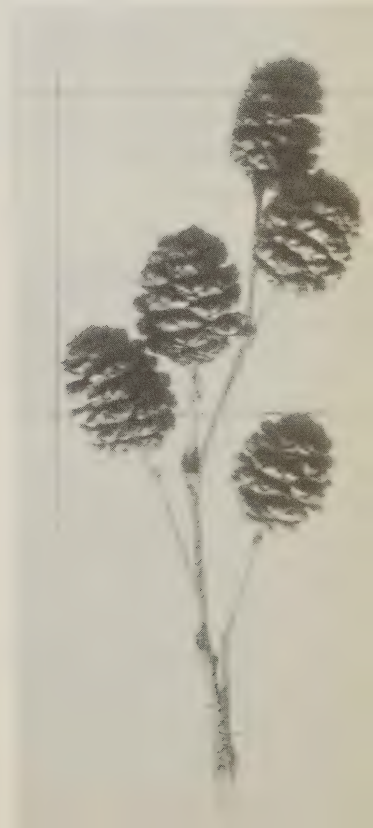
SITKA ALDER



TWIG, WINTER BUDS
AND PREFORMED
MALE FLOWERS



LEAF



OPEN CONES

BEECH

Fagus grandifolia Ehrh.

American beech, red beech.

The beech is a medium to large tree 70 to 80 feet in height and 2 to 4 feet in diameter. The trunk is usually straight and erect when grown in a dense stand on a fertile site, and rises to a good height before branching into a broad, shallow crown. Elsewhere, on poor sites and in the open, the trunk is much shorter, often crooked, and breaks up not far from the ground into a dense, massive crown of wide-spreading branches which are tough and flexible. The roots are usually shallow.

In Canada the beech is found throughout the hardwood region from Cape Breton Island to the north shore of Georgian Bay, but it does not grow as far north as the yellow birch and sugar maple. It is commonly found on rich bottomlands and moist, well-drained slopes and ridges. It sometimes grows in pure stands of limited extent, but is usually mixed with other native hardwoods.

The clean, smooth, close-fitting, light blue-grey bark of the trunk has made this tree one of the best known wherever it occurs. Except when young it is rarely mistaken for any other tree, even in winter.

. . .

Ten species of *Fagus* L. are known, and all are found in the northern hemisphere. Only one species is native to North America.



LEAVES—Alternate, simple, elliptical in outline, sharp-pointed, coarse-toothed with sharp incurved teeth, $2\frac{1}{2}$ to 6 inches long; dark blue-green above, paler below.

FLOWERS—April-May, after the leaves; unisexual; male in drooping, yellow-green heads, female in short spikes, both on the same tree.

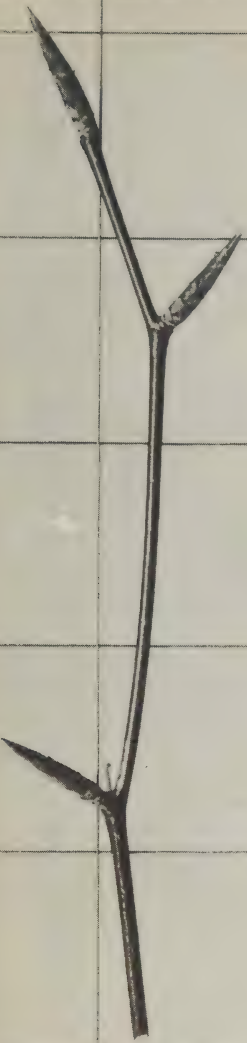
FRUIT—October; a three-cornered, sharp-pointed, shiny, brown, edible nut, about $\frac{3}{4}$ of an inch long; borne usually in pairs in a prickly brown husk, opening at maturity.

TWIGS—Slender, slightly zigzag, shiny, reddish-brown to brownish-grey. Terminal bud $\frac{3}{4}$ to 1 inch long, cylindrical, with shiny, brown, slightly hairy scales; lateral buds similar, diverging from the twig.

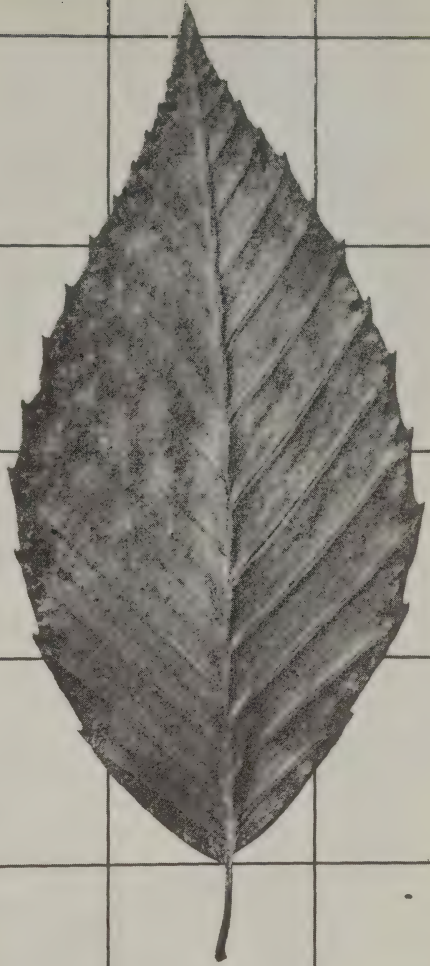
BARK—Thin, smooth, light blue-grey, often mottled with darker patches.

WOOD—Heavy, hard, strong, diffuse-porous; reddish-brown with almost white sapwood.

The wood is used for flooring, furniture, vehicle stock, railway ties, cooperage, handles, and woodenware. Beech is the only wood used in the filtering process of vinegar manufacture.



WINTER TWIG



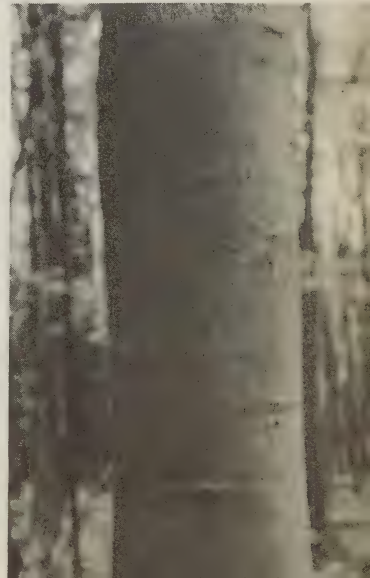
LEAF



OPENED HUSKS
AND NUTS



MATURE BARK



THE CHESTNUTS

CHESTNUT

Castanea dentata (Marsh.) Borkh.

Sweet chestnut.

The chestnut was attacked about 40 years ago by the chestnut blight, a fungous disease introduced into North America from Asia. All commercial stands have been destroyed. The only survivors are a very few old trees and the numerous sprouts which spring up from the rotting stumps.

The chestnut was a large tree 75 to 80 feet in height, and 2 to 3 feet in diameter, sometimes reaching a height of 100 feet. The trunk was usually long and straight. It had little taper except when grown in the open, where it divided into a few heavy branches not far from the ground, and formed a broad, rounded crown.

It was found naturally in Canada only in southern Ontario, from the Niagara River and Lake Ontario westward to the Detroit River and Lake St. Clair. Here it grew on a variety of soils in association with the various other hardwoods of the region. It is easily distinguished from any other native species by its spiny burrs which contain 1 or more shiny brown nuts.

. . .

About 10 species of chestnut, *Castanea* Mill., are known, 5 native to North America; only 1 native to Canada.

The horse-chestnut, *Aesculus hippocastanum* L., is not a true chestnut, neither is it a native of this country, although widely planted as an ornamental tree in our eastern towns and cities.



LEAVES—Alternate, simple, widest about the middle, coarse-toothed with sharp incurved teeth, 6 to 9 inches long; dull yellow-green above, paler below.

FLOWERS—June-July, after the leaves; in unisexual and bisexual catkins; both on the same tree.

FRUIT—October-November; a dark brown, thin-shelled, sweet, edible nut, about $\frac{3}{4}$ of an inch long; borne solitary or in clusters of 2 to 5 in a rounded, prickly burr, 2 to 2½ inches in diameter; opening with the first frost.

TWIGS—Moderately stout, smooth, shiny, reddish-brown. No terminal bud; lateral buds blunt, up to $\frac{1}{4}$ of an inch long, with dark brown scales.

BARK—Smooth, dark brown at first; becoming furrowed into hard, scaly, longitudinal ridges.

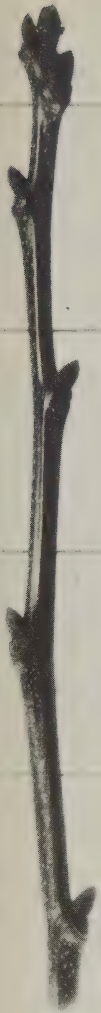
WOOD—Light, soft, not strong, straight-grained, ring-porous; greyish-brown with paler sapwood.

The wood is used for core-stock, interior finish, and cabinet-work. It is very resistant to decay and is valuable for posts, poles, and railway ties, and is a source of tanning extract. Very little chestnut lumber was ever produced in Canada.

CHESTNUT

WINTER

◀ TWIG



LEAF ▶



FRUIT ▶



The OAKS *Quercus* L.

The oaks are widely distributed throughout the north temperate zones of North America, Europe, and Asia: few are found south of the equator. The genus includes more than 200 species of trees and shrubs, with a large number of varieties and hybrids. Possibly 75 or 80 species are native to North America, of which 53 are known to reach tree size. Twelve species have been found in Canada, most of them being confined to the southern peninsula of Ontario. One species, Garry oak, is found in British Columbia, and two others, bur oak and red oak, range across the eastern provinces. All of the native oaks, except the dwarf chinquapin oak, *Quercus prinoides* Willd., reach tree size. The post oak, *Quercus stellata* Wang., has been reported in southern Ontario but its existence there has never been authoritatively confirmed. The English oak, *Quercus robur* L., and the durmast oak, *Quercus petraea* (Mattuschka) Lieblein, are occasionally planted for decorative purposes and as memorial trees.

The Canadian oaks are all deciduous trees with alternate, simple, variously lobed or toothed leaves; twigs with solid, star-shaped pith; winter buds with overlapping scales; and hard, more or less deeply furrowed, bark. The terminal bud is always present and is frequently surrounded by a cluster of smaller lateral buds. The flowers are unisexual, appearing when the leaves are about one-third grown. The male flowers are borne in drooping catkins; the female are either solitary or clustered on short spikes. Both sexes appear on the same twig. The fruit is the well-known acorn, consisting of a thin-shelled nut enclosed at the base by a cup of overlapping scales. It matures in 1 or 2 seasons, depending upon the species. In the United States and elsewhere in the world there are species which retain their green leaves throughout the winter and are known as evergreen or "live" oaks. None of these is native to Canada.

The Canadian oaks can be divided into two groups—the white oaks and the red or black oaks.

WHITE OAKS

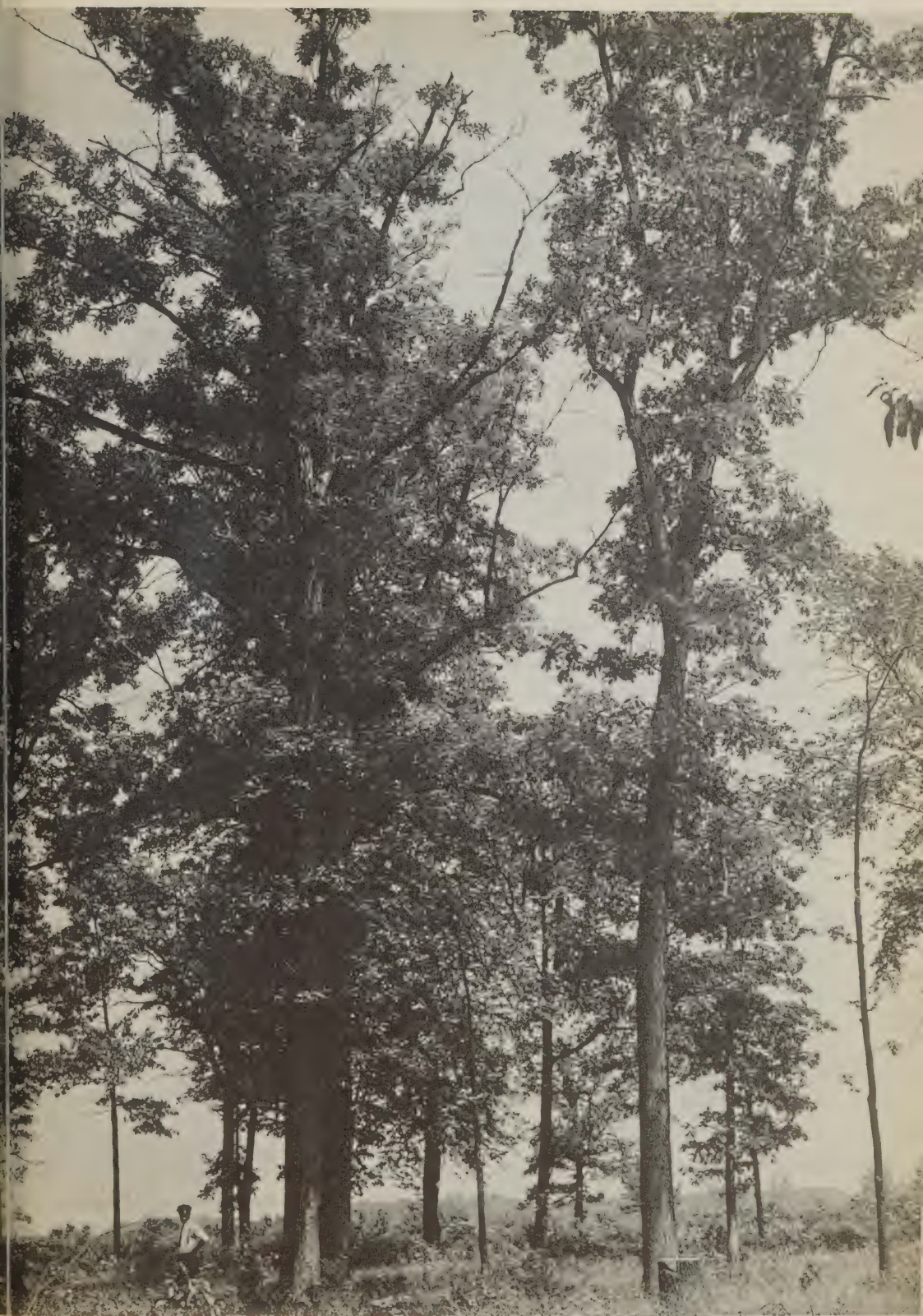
Bur oak
White oak
Swamp white oak
Chinquapin oak
Chestnut oak
Garry oak

RED OAKS

Red oak
Black oak
Scarlet oak
Pin oak
Northern pin oak

The leaf margins of the first group are cut into rounded and blunt (never bristle-tipped) lobes or teeth. The acorn matures in 1 season, the inner surface of the shell is usually smooth, and the kernel is sweet and edible. In contrast, red oak leaves have bristle-tipped, more or less deeply cut lobes. The acorn requires 2 seasons to mature, the inner surface of the shell is usually hairy, and the kernel is bitter. The shrubby dwarf chinquapin oak is classed as a white oak.

The wood of the oaks is generally hard, heavy and strong. It has a pronounced growth-ring figure and is also characterized by ribbon-like stripes across the grain on quarter-sawn surfaces. The figure and durability of the wood have kept it in continuous demand for flooring, furniture, and interior finish, so that the better grades bring high prices. The wood of none of the oaks has ever been plentiful in Canada. The wood of the white oaks is very resistant to decay and is generally preferred to that of the red oaks.



WHITE OAK, GROWN IN SOUTHERN ONTARIO

WHITE OAK

Quercus alba L.

Stave oak.

The white oak is the most important member of its genus, since it produces the bulk of the timber commonly marketed under that name. It reaches a diameter of 2 to 4 feet and a height of 50 to 100 feet. It is a stately tree and in the open develops a very massive, broad crown composed of far-reaching, stout, twisted limbs. In the forest the trunk is long, clear of branches for much of its length, and supports a short, narrow crown. This tree is very firmly anchored with a deep tap root and several deep spreading lateral roots.

It is found in Canada throughout southern Ontario and southern Quebec, where it grows on a wide variety of sites, ranging from sandy or gravelly ridges to moist bottomlands. In comparison with sugar maple and beech, white oak is only moderately tolerant, preferring association with basswood, white ash, black cherry, various hickories, and other oaks to that of the more aggressive hardwoods. It is rarely found in pure stands or in association with coniferous species.



LEAVES—Alternate, simple, with 5 to 9 deeply cut, rounded lobes, 4 to 9 inches long; smooth, bright green above, paler below.

FLOWERS—June, after the leaves; unisexual; male in drooping, yellow catkins, female solitary, bright red, both on the same tree.

FRUIT—Autumn; a sweet, edible acorn; the nut $\frac{1}{2}$ to 1 inch long, enclosed for about $\frac{1}{4}$ of its length in a shallow cup of thickened, knotty scales, slightly hairy on the inner surface.

TWIGS—Moderately stout, green, reddish or grey, often hairy, terminal bud $\frac{1}{8}$ to $\frac{3}{16}$ of an inch long, rounded, covered with smooth, reddish-brown scales, larger than the laterals.

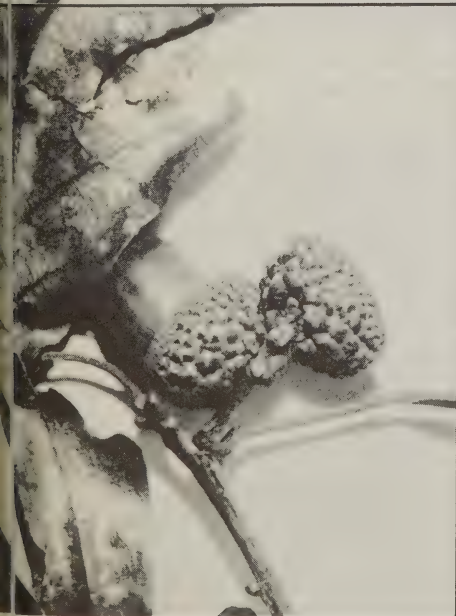
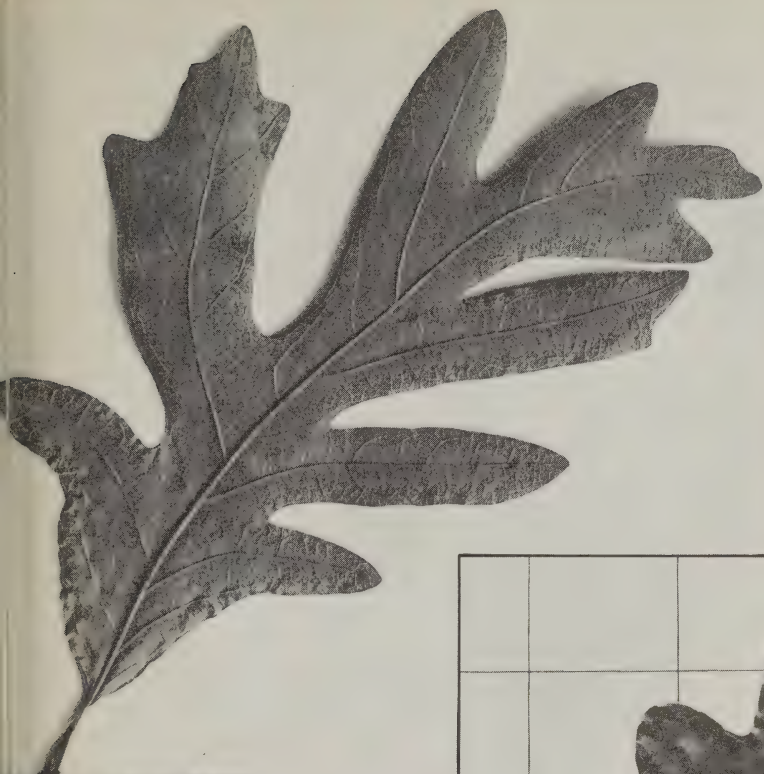
BARK—At first smooth, light ashy-grey; later divided by shallow fissures into long irregular scales or plates.

WOOD—Heavy, hard, strong, close-grained, ring-porous; pale brown with lighter sapwood.

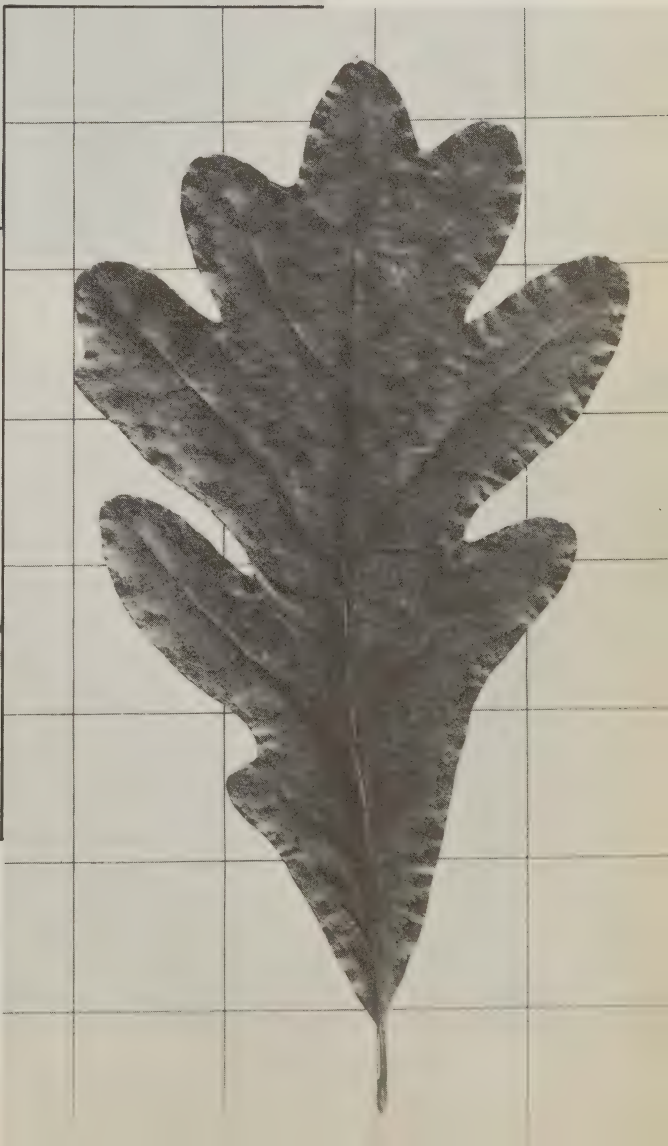
The more important uses of the white oak depend on its strength, toughness, durability, and appearance. The wood is used in greatest quantity for flooring, furniture, and interior finish, but it is also in particular demand for the manufacture of boats and vehicles. Wood of this and other species of the white oak group is preferred for tight cooperage for alcoholic liquids.

WHITE OAK

LEAVES



FRUIT (ACORN)



BUR OAK

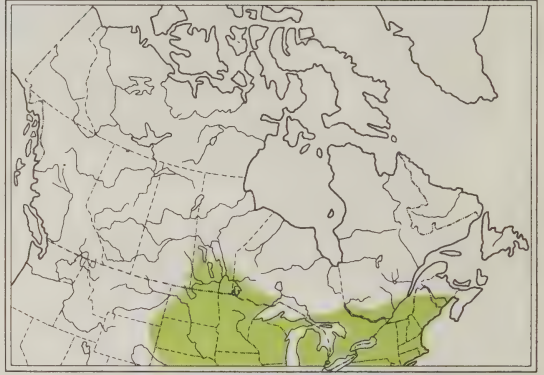
Quercus macrocarpa Michx.

Scrub oak, blue oak, mossycup oak, overcup oak.

In Canada, the bur oak seldom reaches the large sizes found farther south, being rarely found more than 40 to 50 feet in height and 1 to 2 feet in diameter. The crown is broad and round, and the branches are wide-spreading, except in the northwestern part of its range, where it is often little better than a shrub and is known by the name "scrub" oak. On good sites in the forest, it develops a long, straight trunk and the branches are confined to the top of the tree.

This oak is found from the valley of the St. John River in southwestern New Brunswick to Lake Superior, and beyond that lake to the valleys of the Pipestone and Qu'Appelle Rivers in eastern Saskatchewan. It grows farther north and west than any other of the eastern oaks. For the most part it is confined to rich bottom-lands and low hillsides, growing generally with the soft maples, white elm, red and green ash, and other moderately tolerant species.

Bur oak can be readily distinguished from any other native oak by its twigs, which develop corky ridges or wings, and by the distinct fringe surrounding the top of the acorn cup.



LEAVES—Alternate, simple, with 5 to 9 lobes, the terminal large and separated from the others by deep, rounded notches usually extending nearly to the midrib, 4 to 10 inches long; dark green and shiny above, paler and hairy below.

FLOWERS—June, after the leaves; unisexual; male in drooping, yellowish-green catkins; female reddish, solitary or paired, both on the same tree.

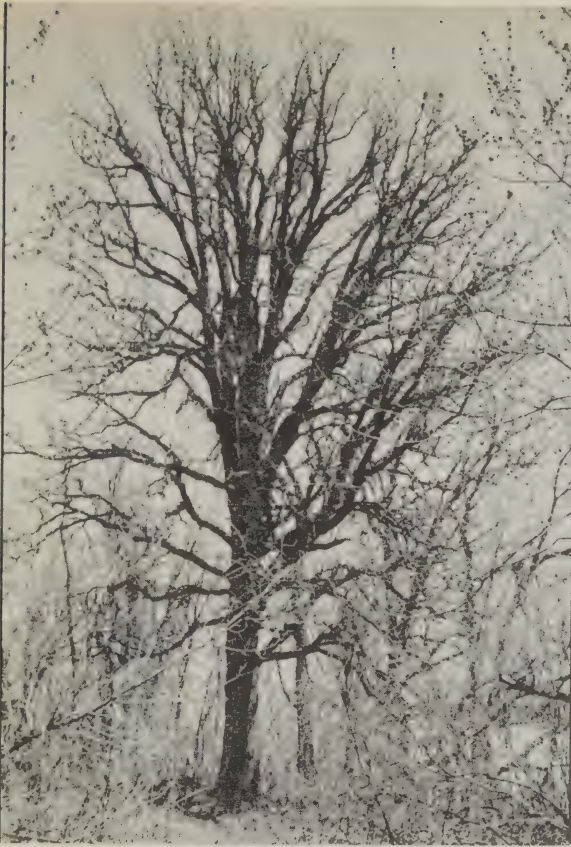
FRUIT—Autumn; a sweet acorn; the nut $\frac{3}{4}$ to $1\frac{1}{4}$ inches long, enclosed for about $\frac{1}{2}$ its length in a deep cup, downy on the inner surface and covered with large scales forming a fringe around the top.

TWIGS—Stout, yellowish-brown, usually hairy and ridged. Terminal bud hairy, reddish-brown, $\frac{1}{8}$ to $\frac{1}{4}$ of an inch long, larger than the lateral buds.

BARK—Pale brown; rough and divided by deep furrows into scaly plates.

WOOD—Heavy, hard, strong, ring-porous; brownish with paler sapwood.

The wood is commercially not distinguished from white oak and is used for flooring, interior finish, cabinet-work, and furniture. It is also in demand for boat manufacture, vehicle stock, and tight cooperage.

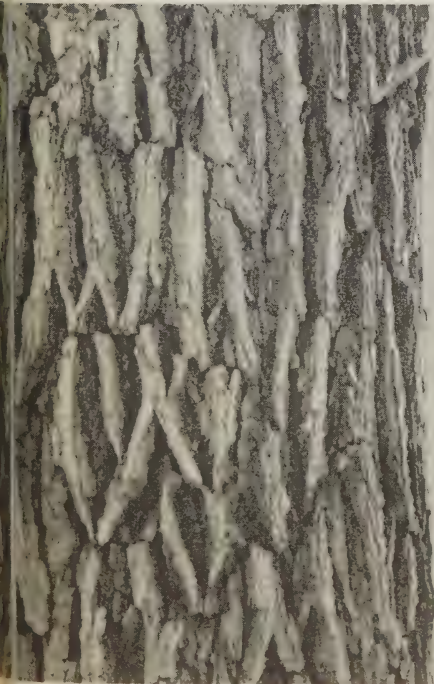


TREE

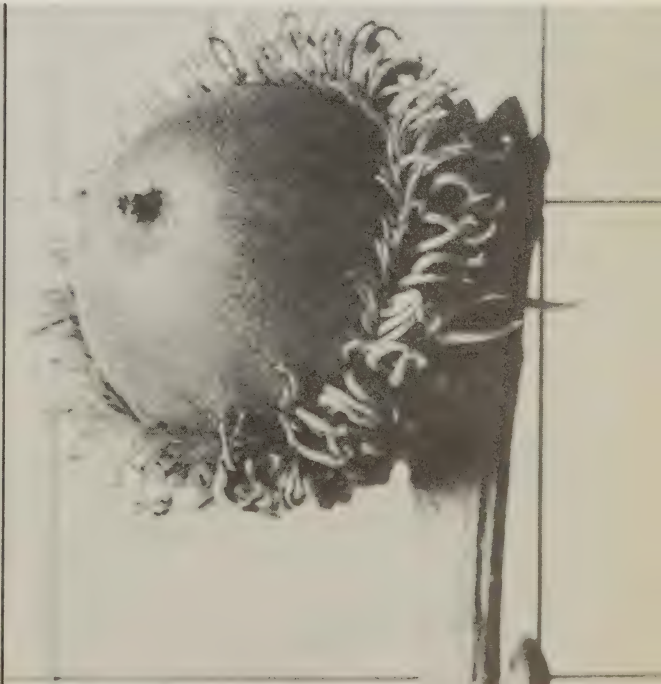


LEAF

WINTER
WIG



MATURE BARK



FRUIT (ACORN)

SWAMP WHITE OAK

Quercus bicolor Willd.

Blue oak.

The swamp white oak, as its name implies, prefers moist soils and low sites. It is a medium-sized tree, averaging 50 to 60 feet in height and 2 to 3 feet in diameter. The trunk is long and mostly clear of branches in the forest; in the open it is shorter and bears a deep, broad, round-topped crown. The branches are relatively slender for an oak, those at the top mostly ascending, those at the bottom drooping. The small, crooked branchlets which hang from the larger limbs are characteristic of this tree.

The swamp white oak ranges from southwestern Quebec westward to the Detroit River and the lower end of Lake Huron. It has also been reported from King's County in Nova Scotia. It is never abundant, and, as a rule, is found only on rich, moist soils along streams, at the edges of swamps, and on wet flats.

The long-stalked acorns, shallow-lobed leaves, and crooked, drooping, lower branches are the most reliable distinguishing characteristics of this oak.



LEAVES—Alternate, simple, irregular and shallow-lobed with 6 to 10 pairs of large, rounded teeth, or occasionally lobed half-way to the midrib, 4 to 6 inches long; dark green and shiny above, pale green and downy below.

FLOWERS—June, after the leaves; unisexual; male in yellowish-green catkins, female in few-flowered spikes; both on the same tree.

FRUIT—Autumn; an acorn; the nut $\frac{3}{4}$ to $1\frac{1}{4}$ inches long, enclosed for about $\frac{1}{3}$ of its length in a deep cup, hairy on the inside, the scales forming a slight fringe around the top; borne on slender stems 1 to 3 inches long.

TWIGS—Stout, smooth or slightly downy, yellowish to reddish-brown. Terminal bud $\frac{1}{16}$ to $\frac{1}{8}$ of an inch long, blunt to rounded, chestnut-brown, rarely downy, larger than the lateral buds.

BARK—At first smooth, reddish-brown; soon peeling into long, persistent scales; becoming greyish-brown and broken into long, scaly ridges.

WOOD—Heavy, hard, strong, ring-porous; light brown with paler sapwood.

The wood of this species is sold with that of the other white oaks and is used for flooring, interior finish, cabinet-work and furniture, boat building, and tight cooperage.

SWAMP WHITE OAK

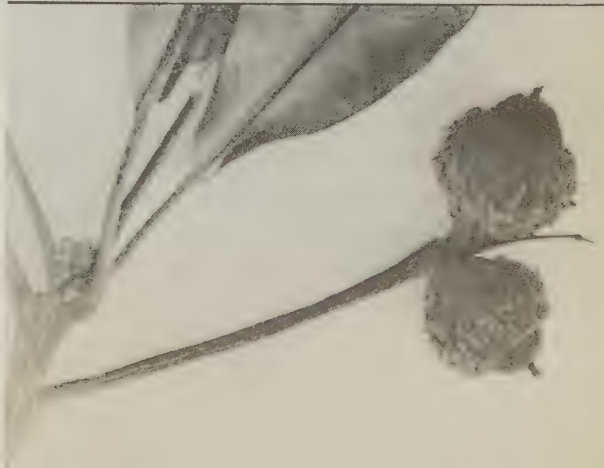


WINTER TWIG



LEAF

IMMATURE FRUIT
(ACORNS), ENLARGED



CHESTNUT OAK

Quercus prinus L.**Rock oak, mountain oak.**

The chestnut oak is usually a small tree 35 to 40 feet in height and 1 to 2 feet in diameter, but when growing in a crowded forest condition it will often reach heights of 60 to 70 feet with a long, stout trunk and a short crown. Growing in the open, the trunk tends to divide near the ground into several large limbs, which form a rounded open crown of wide-spreading branches.

This oak has a very limited range in Canada, being found only in that part of the province of Ontario that borders on Lake Erie and Lake St. Clair. Like the chinquapin oak with which it is frequently associated, it is usually found on dry, rocky, or sterile soils and limestone ridges. The best growth, however, is made on rich soils near streams. It forms nearly pure stands of limited extent on poor sites, or mixes with other bottom-land hardwoods elsewhere.

The name chestnut oak arises from the supposed similarity of its leaves to those of the chestnut.



LEAVES—Alternate, simple, nearly elliptical in outline, shallow-lobed or coarse-toothed with rounded teeth, 4 to 9 inches long; yellowish-green, shiny above, paler, often hairy, below.

FLOWERS—May-June, after the leaves; unisexual; male in drooping catkins; female in short spikes, both on the same tree.

FRUIT—Autumn; a sweet, short-stalked acorn; the nut $\frac{3}{4}$ to $1\frac{1}{2}$ inches long (several times as long as broad), enclosed for $\frac{1}{3}$ to $\frac{1}{2}$ its length in a thin cup of knobby, hairy scales.

TWIGS—Stout, smooth, orange to reddish-brown. Terminal bud $\frac{1}{3}$ to $\frac{1}{2}$ inch long, sharp-pointed, chestnut-brown, similar to the lateral buds.

BARK—At first smooth, reddish-brown; becoming nearly black, furrowed into hard, broad, somewhat scaly ridges.

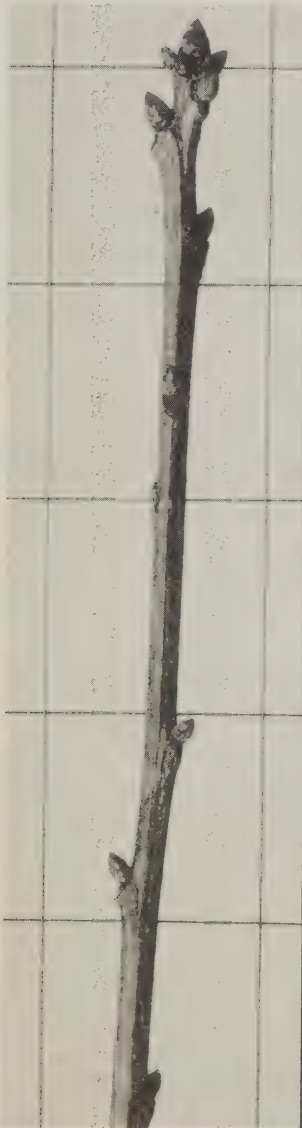
WOOD—Heavy, hard, strong, ring-porous; dark brown with paler sapwood.

When of sufficient size it may be used for flooring, interior finish, furniture, boat building, and tight cooperage. It is of particular value as a source of tannin when used with that from hemlock to offset the red colour.

CHESTNUT OAK



FRUIT (ACORN)



WINTER TWIG



LEAF

CHINQUAPIN OAK

Quercus muehlenbergii Engelm.

Yellow oak, chestnut oak.

In the forest the chinquapin oak sometimes reaches a height of 80 to 90 feet or more, but when growing in the open is usually a relatively small tree 35 to 40 feet in height and 1 to 2 feet in diameter. The trunk is tall and straight, usually extends well up into the crown, and is frequently broadly buttressed at the base. The crown is composed of many short branches and in shape is narrow with a rounded top.

In Canada this oak is confined to the southern part of Ontario, where it occurs in Leeds County at the foot of Lake Ontario, and from Niagara westward along the north shore of Lake Erie. It is not a common tree, and as a rule prefers dry, often rocky, ridges, especially those of a limestone origin.

The chinquapin oak is easily confused with the chestnut oak and the dwarf chinquapin oak, *Quercus prinoides* Willd. It can be distinguished from the first species by its scaly grey bark, and from the second by its larger size and sharp-pointed buds.



LEAVES—Alternate, simple, with 8 to 13 pairs of sharp-pointed, often incurved, teeth, 4 to 7 inches long; yellowish-green and smooth above, pale silvery and downy below.

FLOWERS—June, after the leaves; unisexual; male in drooping catkins, female red, clustered, both on the same twig.

FRUIT—Autumn; a sweet, edible acorn, the nut $\frac{1}{2}$ to 1 inch long, enclosed for $\frac{1}{3}$ to $\frac{1}{2}$ its length in a deep cup of small, hairy scales.

TWIGS—Slender, greyish to orange-brown, smooth. Terminal bud about $\frac{1}{8}$ of an inch long, pointed, chestnut-brown, similar to the lateral buds.

BARK—Thin, grey, or nearly white, shallowly furrowed into flat, scaly ridges.

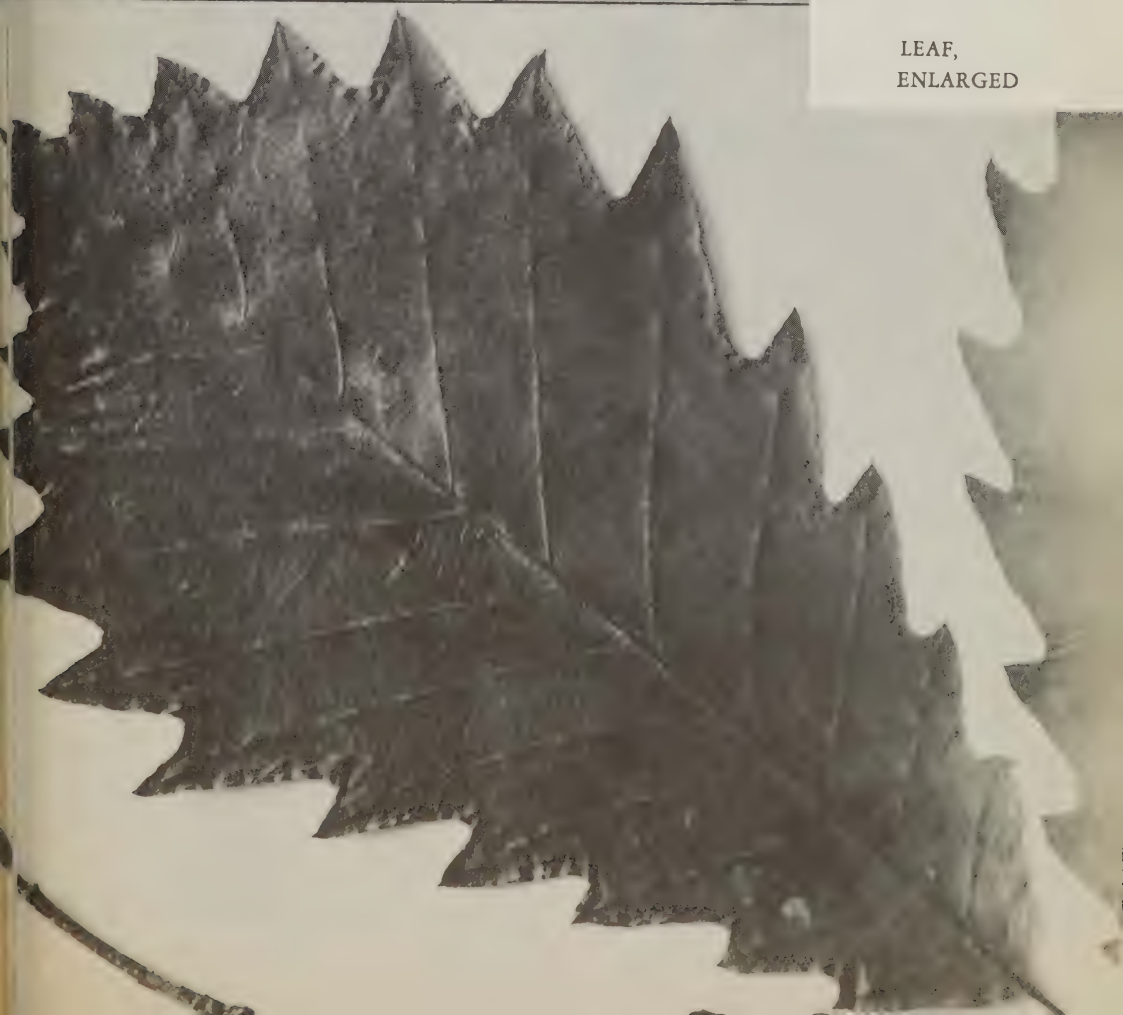
WOOD—Heavy, hard, strong, ring-porous; dark brown with paler sapwood.

This is one of the least important of the Canadian oaks. The wood is sold as white oak for flooring, cabinet-work and furniture, and tight cooperage.

CHINQUAPIN OAK



FRUIT (ACORN),
ENLARGED



LEAF,
ENLARGED

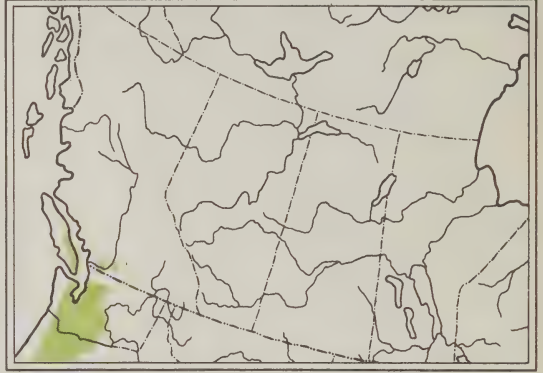
GARRY OAK

Quercus garryana Dougl.

Oak, white oak, Oregon oak, Oregon white oak, Pacific post oak, Pacific white oak, British Columbia oak, western white oak.

On good sites in sheltered situations the Garry oak is a medium-sized tree 50 to 60 feet in height and 12 to 30 inches in diameter. On poorer sites or when exposed to the salt winds from the ocean, it is much smaller, frequently only a low, bushy shrub. The short, stout trunk is rarely unbranched for more than 10 or 15 feet above the ground; the crown of stout gnarled branches is broad and round-topped.

This is the only species of oak native to British Columbia. It is not common and is found only on the east coast of Vancouver Island as far north as the Courtenay Valley, on the adjacent islands in the Georgia Straits, and at Sumas and Yale in the Fraser River Valley on the mainland. It has also been reported, but not verified, from Quatsino Sound at the northwest end of Vancouver Island. It prefers dry, well-drained, rocky or gravelly slopes where it is able to compete with the more tolerant coniferous species. It is seldom found in dense stands or mixed with other species, but usually grows in park-like groves, bordered by Douglas fir and arbutus.



LEAVES—Alternate, simple, with 5 to 7 deeply cut, rounded lobes, $3\frac{1}{4}$ to $6\frac{1}{2}$ inches long; deep green, shiny, and smooth above, pale green or orange-brown, smooth or hairy below.

FLOWERS—Early summer; unisexual; male in hairy catkins, female solitary or in pairs, both on the same tree.

FRUIT—Autumn; a sweet, edible acorn; the nut 1 to $1\frac{1}{4}$ inches long, enclosed for about $\frac{1}{3}$ its length by a shallow cup of thickened, hairy scales with free, pointed tips.

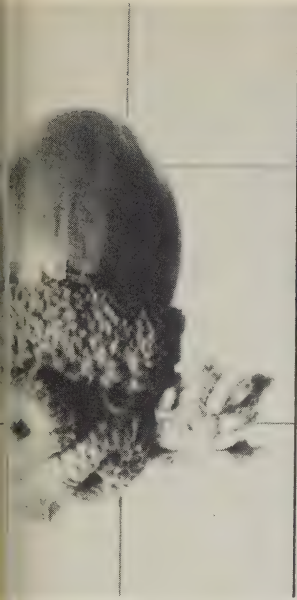
TWIGS—Stout, hairy the first season, orange-red. Terminal bud $\frac{1}{4}$ to $\frac{1}{2}$ inch long, covered with rusty-brown, hairy scales, similar to the lateral buds.

BARK—Smooth on young stems; breaking into shallow fissures and long, broad, grey or greyish-brown, scaly ridges on older trunks.

WOOD—Heavy, hard, strong, ring-porous; light yellowish-brown with almost white sapwood.

The quantity of Garry oak is too small for the tree to be of much importance commercially in Canada. The wood is similar to that produced by the white oak and may be used for flooring, cabinet-work, furniture, and tight cooperage.

GARRY OAK



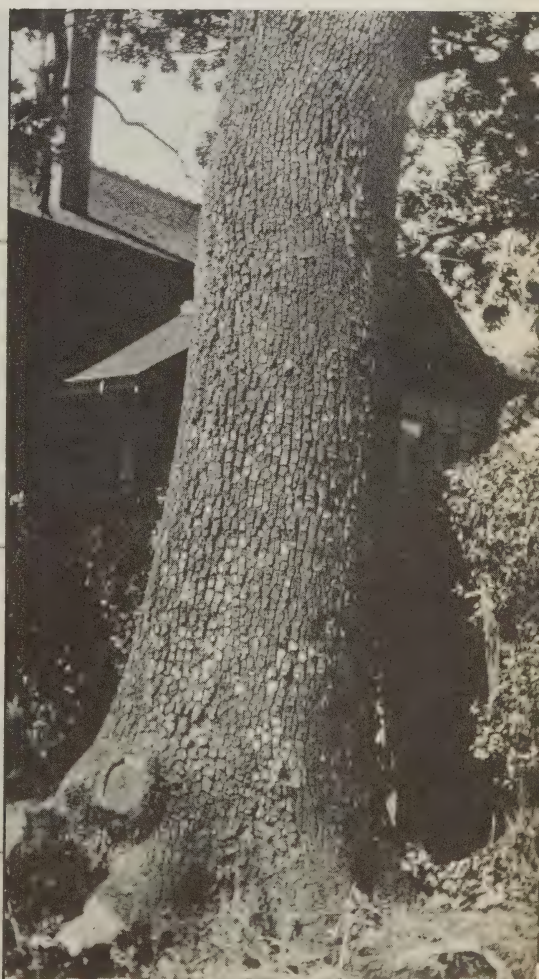
FRUIT (ACORN)



LEAF



WINTER TWIG



MATURE BARK

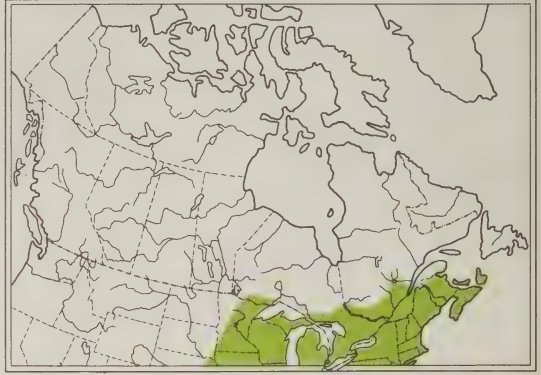
RED OAK

Quercus rubra L.

Northern red oak, black oak.

The red oak is the most widely distributed member of its group in Canada. It is a large tree, usually 60 to 80 feet high and 2 to 3 feet in diameter; sometimes exceeding 100 feet in height and 4 feet in diameter. In the forest the trunk is tall and frequently clear of branches for more than $\frac{2}{3}$ of its length. When growing in the open it may rise to a good height, or it may divide near the ground into several stout wide-spreading branches. In either case, open-grown trees develop broad rounded crowns of stout branches. The root system is deep and spreading; and may on occasion produce a tap root.

Red oak is found somewhat sparingly from Cape Breton Island in Nova Scotia to Georgian Bay in Ontario, and also west of Lake Superior along the International Boundary almost to the Lake of the Woods. It is our most rapid-growing oak and will do well on a variety of soils. It is only moderately tolerant of shade and for this reason is commonly found on a sandy loam or rocky site with the intolerant aspens and white birch and the white and red pines. On the poorest sites, the trees are usually low and scrubby.



LEAVES—Alternate, simple, with 7 to 11 more or less deeply cut, bristle-tipped lobes extending about half-way to the midvein, 5 to 8 inches long; dull green, smooth above, yellow-green, smooth, except for small tufts of hair in the angles of the veins, below.

FLOWERS—May-June, after the leaves; unisexual; male in greenish-yellow catkins, female greenish, usually clustered, both on the same tree.

FRUIT—Autumn of the second year; a bitter acorn; the nut $\frac{1}{2}$ to $1\frac{1}{4}$ inches long, enclosed for $\frac{1}{4}$ to $\frac{1}{3}$ of its length in a thick, somewhat hairy, reddish-brown cup of small tightly overlapping scales.

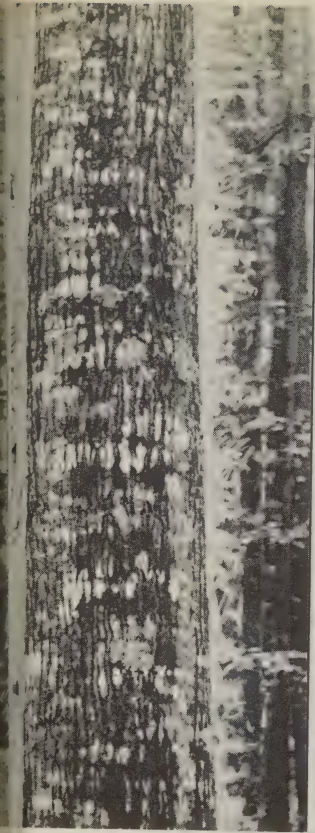
TWIGS—Moderately stout, dark red to greenish-brown, smooth. Terminal bud pointed, about $\frac{1}{4}$ of an inch long, covered by reddish-brown, more or less hairy scales; lateral buds similar, but smaller.

BARK—Smooth, greenish-brown on young stems; becoming darker, shallow-fissured into hard, flat-topped, scaly ridges on older trunks.

WOOD—Hard, heavy, strong, close-grained, ring-porous; reddish-brown with paler sapwood.

The wood of red oak is not as resistant to decay as that of the white oaks, neither is it as suitable for tight cooperage. It is used for flooring, interior finish, and furniture.

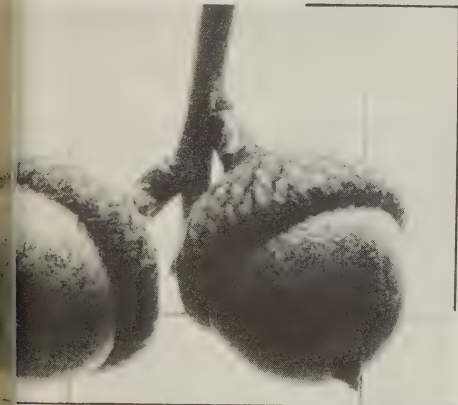
RED OAK



MATURE BARK



LEAF



FRUIT
(ACORNS)



WINTER TWIG

BLACK OAK

Quercus velutina Lam.

Yellow oak, yellow-barked oak, red oak.

In Canada the black oak is a medium-sized tree up to 60 to 70 feet high and 2 to 3 feet in diameter. Farther south, where conditions are more favourable for its development, it is classed as one of the largest members of the red oak group and sometimes reaches a height of 150 feet and diameters in excess of 4 feet. The crown of slender branches is irregular in form, sometimes tall and narrow and at other times wide and spreading. The root system comprises a deep tap root and several large spreading lateral roots.

This tree is found in southern Ontario from Toronto to Lake Huron, where it is usually confined to the poorer gravelly and sandy soils. It is intolerant of shade and rarely occurs in pure or in dense stands.

The yellow bitter inner bark, which will colour the saliva if chewed, is a good distinguishing feature of this tree. The bark is deeply furrowed and considerably rougher than that of either the red or the scarlet oaks. The large buds completely covered with pale hairs are another sure means of identification.



LEAVES—Alternate, simple, with 7 to 9 more or less deeply cut, broad to narrow, usually forked, bristle-tipped lobes 4 to 7 inches long; dark shiny green above, paler and more or less downy below.

FLOWERS—May-June, after the leaves; unisexual; male in catkins, female usually clustered, both on the same tree.

FRUIT—Autumn of the second year; a bitter acorn; the nut frequently hairy, $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long, enclosed for about $\frac{1}{2}$ its length in a deep cup of hairy, loosely overlapping scales.

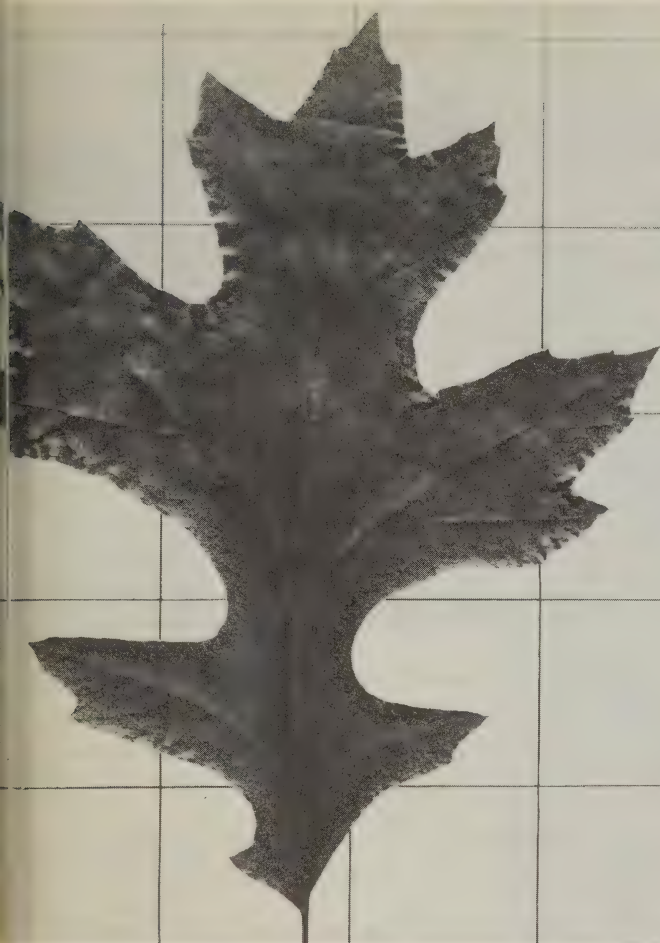
TWIGS—Stout, smooth or somewhat hairy, reddish-brown. Terminal bud sharp-pointed, $\frac{1}{4}$ to $\frac{1}{2}$ inch long, yellowish-grey, hairy, larger than the lateral buds.

BARK—Thick, nearly black on old trunks, furrowed into hard vertical ridges. Inner bark yellowish.

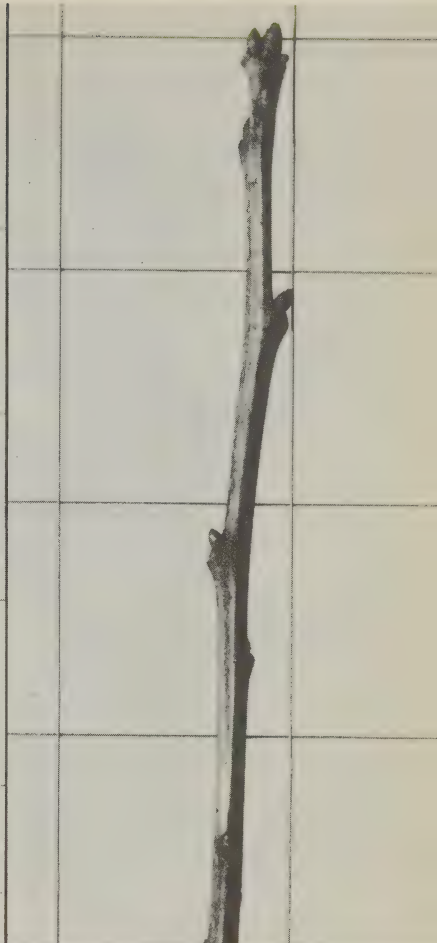
WOOD—Heavy, hard, strong, ring-porous; light brown with paler sapwood.

The wood of black oak is not separated commercially from that of the other red oaks. Typical uses are flooring, interior finish, and furniture.

BLACK OAK



LEAF



WINTER TWIG



IMMATURE FRUIT (ACORNS)



MATURE BARK

SCARLET OAK

Quercus coccinea Muenchh.

Black oak, red oak, Spanish oak.

The scarlet oak is commonly a medium-sized tree 40 to 50 feet in height and 1 to 2 feet in diameter, with a short, rapidly tapering trunk and a narrow, rounded, more or less open crown of slender branches. In a closed stand on a good site it may occasionally reach heights of 70 to 80 feet and larger diameters, but the trunk is still relatively short and much tapered. The branches tend to droop slightly at the ends.

In Canada this oak is confined to the southern part of Ontario from Toronto westward, where it is found growing on sandy and gravelly lands with other oaks and white pine. It cannot endure dense shade, and for this reason is rarely found in dense stands or mixed with the more tolerant hardwoods.

This oak is distinguished by its bright shiny green leaves, which turn a bright scarlet in the autumn. The notches or indentations are wide, rounded, and very deep, deeper as a rule than those of any other native red oak, except possibly the pin oak, and give the foliage a ragged appearance.



LEAVES—Alternate, simple, with 5 to 9 deeply cut, narrow, forked, bristle-tipped lobes, 4 to 7 inches long, bright shiny green, smooth above, paler, smooth below, except for tufts of hair in the angles of the veins.

FLOWERS—May-June, after the leaves; unisexual; male in catkins, female in short spikes, both on the same tree.

FRUIT—Autumn of the second year; a bitter acorn; the nut $\frac{1}{2}$ to 1 inch long, enclosed for $\frac{1}{3}$ to $\frac{1}{2}$ its length in a bowl-shaped cup of shiny closely fitted scales.

TWIGS—Slender, smooth, reddish-brown. Terminal bud $\frac{1}{8}$ to $\frac{1}{4}$ inch long, pointed, slightly hairy, dark reddish-brown; lateral buds smaller.

BARK—At first smooth, brownish; becoming dark brown to nearly black, shallow-fissured into hard, flaky ridges.

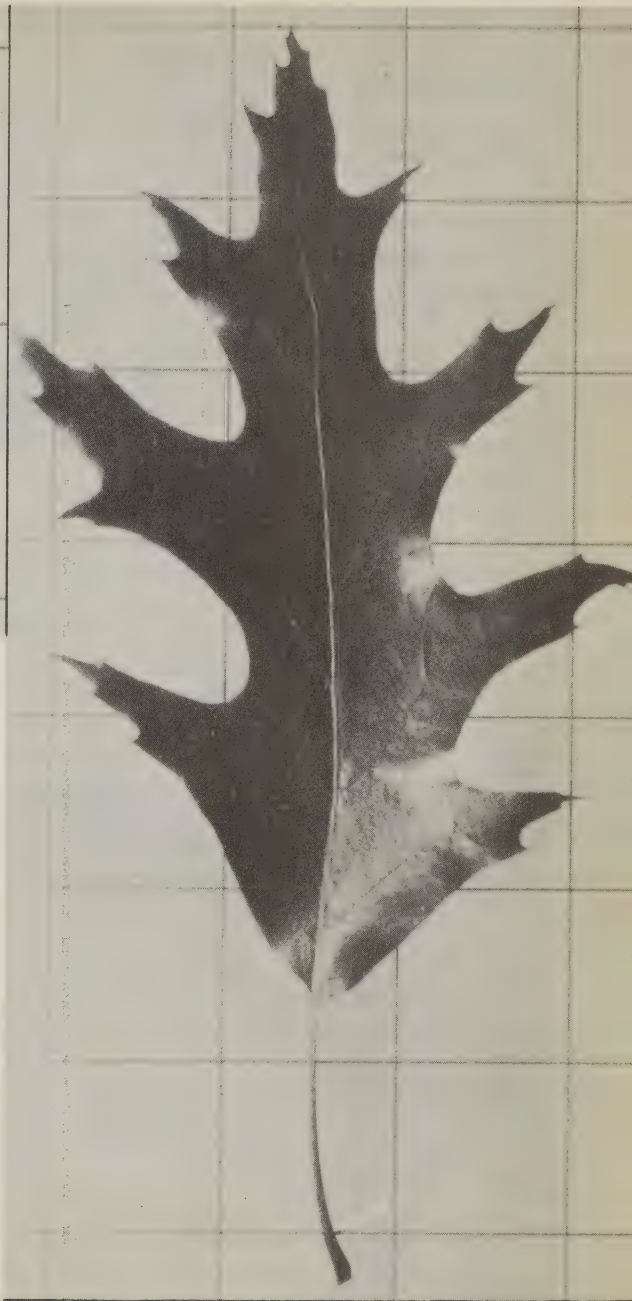
WOOD—Heavy, hard, strong, ring-porous; light reddish-brown with paler sapwood.

Its lumber is sold with that of the other red or black oaks, and is used in the manufacture of flooring and furniture, and for interior finishing.

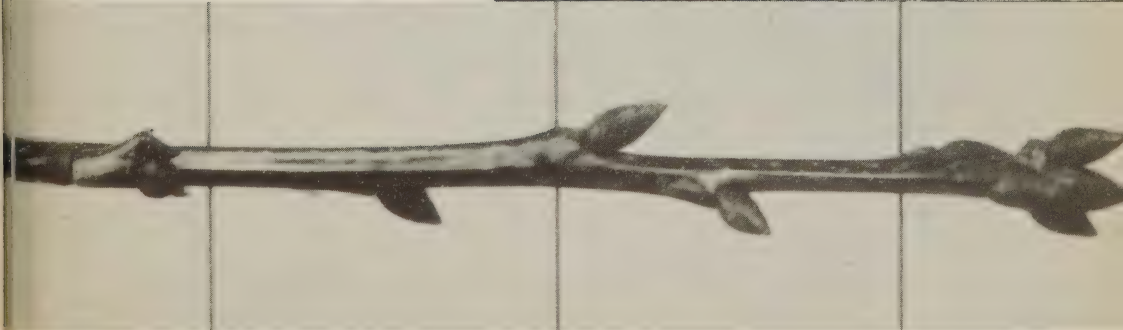
SCARLET OAK



FRUIT (ACORNS)



LEAF



WINTER TWIG

PIN OAK

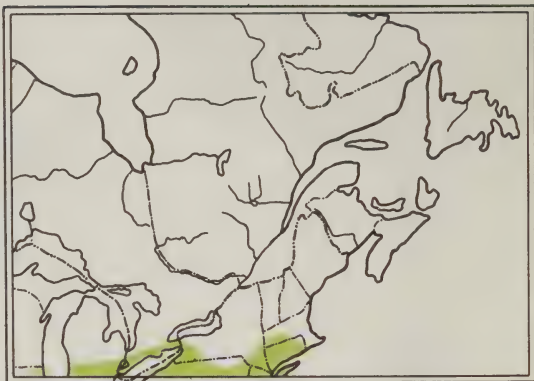
Quercus palustris Muenchh.

Water oak, swamp oak.

The pin oak is a tree of moderate size, usually 50 to 60 feet high and 1 to 2 feet in diameter. The trunk is tall and straight and extends well up into the broad crown of tough, often drooping, branches. Young trees growing in the open are very graceful and are readily distinguished by their characteristic habit of sending their branches out horizontally from the trunk. The name pin oak is probably derived from the many short slender branchlets which stand out from the branches and at a distance have a pin-like appearance.

In Canada, the pin oak is confined to the southern part of Ontario from Niagara westward in the counties bordering on Lake Erie and the Detroit River, where it is frequently found growing in damp situations, such as poorly drained flats and the borders of swamps and streams. It grows singly or scattered in small groups with other hardwoods.

The pin-like branchlets, relatively smooth greyish-brown bark, and thin saucer-like acorn cups are the easiest means of separating this species from the other red oaks of Ontario. It has a marked resemblance to the northern pin oak, *Quercus ellipsoidalis* E. J. Hill, reported from southern Manitoba, but the latter has deep acorn cups which enclose $\frac{1}{3}$ or more of the nut.



LEAVES—Alternate, simple, with 5 or 7 narrow, deeply cut, forked, bristle-tipped lobes, the spaces between them elliptical or angled, 3 to 5 inches long; dark green, smooth and shiny above, paler and smooth, except for tufts of hair in the angles of the veins below.

FLOWERS—Early spring, with the leaves; unisexual; male in brownish catkins, female in short spikes, both on the same tree.

FRUIT—Autumn of the second year, a bitter acorn; the nut about $\frac{1}{2}$ inch long, broader than long, enclosed at the base by a thin saucer-shaped cup.

TWIGS—Slender, smooth, reddish-brown. Terminal bud pointed, smooth, chestnut-brown, about $\frac{1}{8}$ of an inch long, similar to the lateral buds.

BARK—Greyish-brown, at first smooth; later with low, scaly ridges.

WOOD—Heavy, hard, strong, ring-porous; light brown with paler sapwood.

The wood, when utilized in Canada, is sold for lumber as red oak.

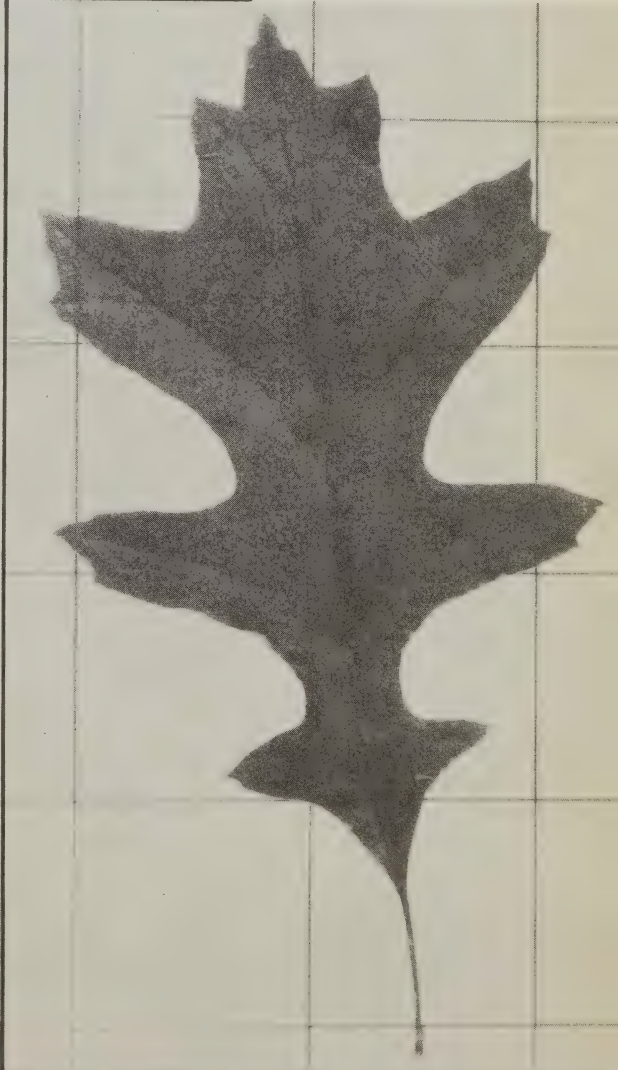
PINOAK



FRUIT (ACORN)



WINTER TWIG



LEAF

The ELMS *Ulmus* L.

Approximately 18 species of elm are recognized throughout the northern hemisphere. Six are found in North America and 3 of these, the white, slippery, and rock elms are native to Eastern or Central Canada. Several exotic species have been brought to this country for shade and ornamental planting, of which the 2 most common are the English elm, *Ulmus procera* Salish., and the Scotch or wych elm, *Ulmus glabra* Huds. The Chinese or Siberian elm, *Ulmus pumila* L., a hardy species adaptable to poor and dry sites, has been recently introduced and is finding considerable favour for shade and shelter-belt planting.

The elms are small- to large-sized deciduous trees with rough dark grey to brownish bark, slender twigs with conspicuous buds, and alternate simple leaves. There is no true terminal bud. At the end of the growing season the tip of the new shoot dies back to the last fully formed mature bud. The leaves of the Canadian elms are a broad oval in outline, lop-sided or unequal at the base, and coarse- and double-toothed on the margins. Their flowers are bisexual and appear from special flower buds before the leaves unfold in the spring. The fruit — technically a samara — consists of a flattened, one-celled, one-seeded body encircled by a thin smooth or hairy wing. On our species it matures before the leaves are fully grown and is shed at once.

Elm wood is generally hard, heavy, and strong, and is noted for its toughness, resistance to splitting, and good bending properties. These qualifications give it considerable importance for special uses. The timber is used extensively for slack cooperage, boxes, veneer products for baskets and cheese boxes, vehicle stock, agricultural implements, and hockey sticks.

The elms belong to the same family as the hackberry, *Celtis* L., a comparatively rare tree in Canada, which might be mistaken for elm. The 2 genera can be readily separated by their fruit and twigs. Hackberry fruit is berry-like and usually remains on the tree over winter. The pith of the twigs is white and finely chambered at the nodes; that of the elm is solid.



ROCK ELM IN THE OTTAWA VALLEY, ONTARIO

WHITE ELM

Ulmus americana L.

American elm, water elm, swamp elm, rock elm.

The white elm is one of the largest and most stately trees in Eastern Canada, sometimes reaching a height of 125 feet and a diameter of 7 feet or more, although the average tree is 60 to 80 feet high and 3 to 4 feet in diameter. In the forest it forms a tall straight trunk which rises to a considerable height before branching, but in the open, away from the influence of other trees, it often divides near the ground into several limbs which gradually spread out to form a broad fan-shaped crown. The lower limbs and small branchlets are more or less drooping. A shallow and very widely spread root system gives this tree good support on all but the wettest of sites.

Its range extends from western Newfoundland and Cape Breton Island to Saskatchewan. White elm thrives on a rich, moist, well-drained sandy loam or gravelly soil, where the water table is near the surface. It grows singly or in mixture with other hardwoods.



LEAVES—Alternate, simple, oval in outline, abruptly sharp-pointed, unequal at the base, coarse- and double-toothed, 3½ to 6 inches long; dark green and smooth or roughened above, paler and usually hairy below.

FLOWERS—April-May, before the leaves, from special flower buds; bisexual; borne on long stems in loose clusters.

FRUIT—May-June; an oval, one-seeded, flattened, greenish samara, about ½ inch in diameter, the thin encircling wing usually notched at the tip and hairy on the margin, falling at maturity.

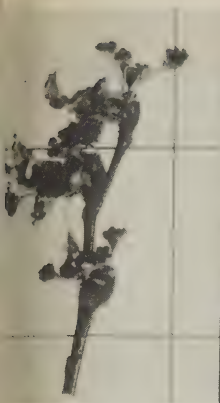
TWIGS—Slender, smooth or hairy, reddish-brown. No terminal bud; leaf-buds pointed, about 1/8 of an inch long, reddish-brown with somewhat hairy scales. Flower buds rounded, larger.

BARK—On old trunks rough, dark grey, furrowed into broad intersecting ridges or with a flaky appearance; inner bark streaked with buff-coloured patches.

WOOD—Heavy, hard, strong, tough, ring-porous; light brown with paler sapwood.

White elm produces one of the most useful hardwoods in Canada, valuable for its size, strength, and toughness. The wood is used in manufacturing cheese boxes and other veneer products, cooperage, inexpensive furniture, and many other utility purposes. The tree is widely used for street and ornamental planting.

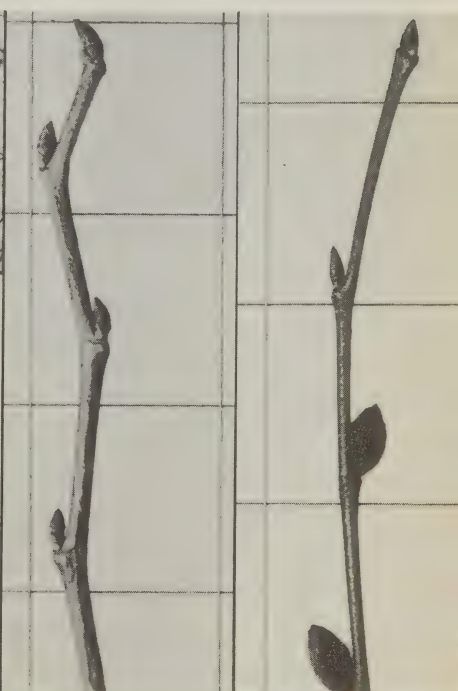
WHITE ELM



FLOWERS



FRUIT (SAMARAS) AND YOUNG LEAVES
MATURE BARK



WINTER TWIGS

◀ LEAF



VASE-SHAPED TREE
ROCKCLIFFE PARK, OTTAWA

SLIPPERY ELM

Ulmus rubra Muhl.

Red elm, slippery-barked elm, soft elm, budded elm.

The slippery elm is the smallest of the Canadian elms, and rarely exceeds a height of 50 to 70 feet and a diameter of 1 to 2 feet. The trunk is long and straight in the forest; short and usually divided into several spreading limbs in the open. The crown of long spreading branches is broad and flat-topped, but differs from that of the white elm in that the tips of the branches tend to be erect.

In Canada this elm is confined to southern Quebec and southern Ontario from the lower St. Lawrence Valley westward to Lake Superior. It prefers rich, well-drained soil and is commonly found along streams and on low slopes. It also occurs on rocky hillsides and limestone ridges but does not thrive there. It grows singly or in small clumps, chiefly in association with butternut, yellow birch, white ash, white elm, and the soft maples.

The slippery elm is readily distinguished by its fragrant, mucilaginous inner bark, from which it derives the name "slippery". The buff areas which are characteristic of the white and rock elms are not present.



LEAVES—Alternate, simple, broad oval in outline, long-pointed, unequal at the base, coarse and double-toothed, 5 to 7 inches long; dark green, very rough above, paler and hairy below.

FLOWERS—April-May, before the leaves, from special flower buds; bisexual; borne on short stems in crowded clusters.

FRUIT—May-June; a nearly circular, one-seeded, flattened samara, about $\frac{3}{4}$ of an inch long, hairy over the seed cavity, the encircling wing smooth, notched at the tip; falling at maturity.

TWIGS—Moderately stout, hairy, pale grey or grey-brown to almost black. No terminal bud; leaf buds blunt, densely hairy, chestnut-brown, about $\frac{1}{4}$ of an inch long. Flower buds larger and rounded.

BARK—On older trunks, rough, reddish-brown, shallow-furrowed into scaly ridges; inner bark streaked with reddish-brown areas.

WOOD—Heavy, hard, strong, ring-porous; reddish-brown with paler sapwood.

Lumber from the slippery elm is ordinarily not separated from that of white elm. It is used for cheese boxes and other veneer products, cooperage, and inexpensive furniture.



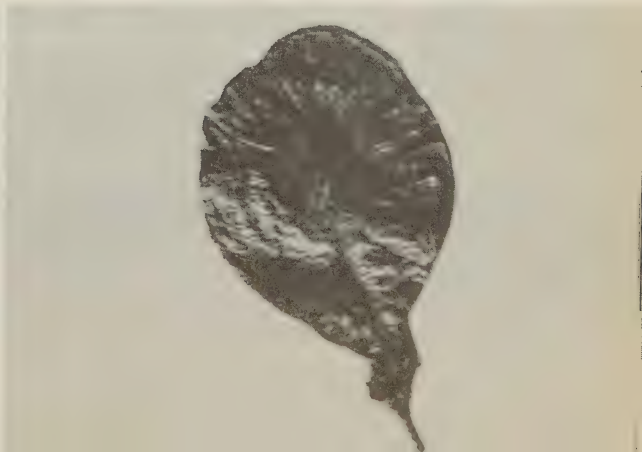
WINTER TWIGS

LEAF BUDS

FLOWER BUDS



LEAF



FRUIT (SAMARA),
ENLARGED

ROCK ELM

Ulmus thomasi Sarg.

Cork elm, hickory elm, cork-barked elm, white elm.

The rock elm is a medium-sized tree 50 to 70 feet in height and 1 to 2½ feet in diameter. The trunk is slender and erect, and in the forest is often clear of branches for ⅔ or more of its length. Even when grown in the open it usually persists undivided almost to the top of the crown. The short slender branches leave the trunk at a wider angle than do those of the white or the slippery elms; the crown is narrow and round-topped, with a somewhat shaggy appearance.



In Canada rock elm is confined to southwestern Quebec and southern Ontario, and probably does not extend north beyond the Ottawa River or Georgian Bay. It grows on a variety of sites from dry and gravelly or heavy clay soils to the rich moist banks of streams, but prefers limestone ridges where it has the least competition from other species. It forms pure stands or grows with butternut, basswood, red ash, and the soft maples.

Its general shaggy appearance and the fact that even the small branchlets and twigs have corky ridges growing from their sides make it easy to distinguish this species with certainty from the other elms.

LEAVES—Alternate, simple, oval in outline, abruptly pointed, unequal at the base, coarse- and double-toothed, 2 to 4½ inches long; dark green, smooth above, paler and hairy below.

FLOWERS—April-May, before the leaves; bisexual; from special flower buds; clustered along a central stem.

FRUIT—May-June; an oval, one-seeded, flattened, pale green, hairy samara about ¾ of an inch long, the encircling wing hairy, slightly thickened; falling at maturity.

TWIGS—Slender, hairy, light reddish-brown; becoming winged with corky ridges. No terminal bud; leaf-buds sharp-pointed, about ¼ of an inch long, chestnut-brown, the scales with marginal hairs. Flower buds larger.

BARK—On old trunks, dark grey, furrowed into broad intersecting ridges; inner bark streaked with buff-coloured areas.

WOOD—Heavy, hard, tough, strong, fine-textured, ring-porous; light brown with paler sapwood.

The wood of this elm is the hardest, toughest, and strongest of the Canadian elms. It is preferred to white elm for dock fenders, the framework in pianos, heavy machinery, and vehicle stock. Its outstanding use is for hockey sticks, and it is a particularly valuable wood for boat framing.

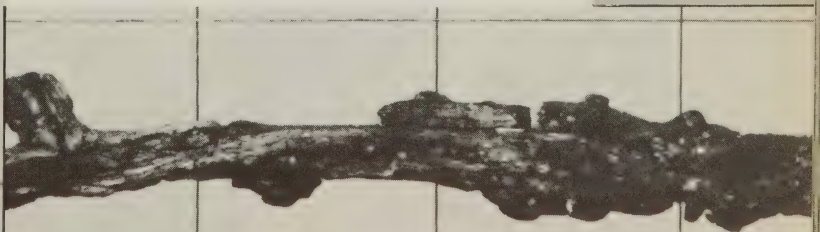
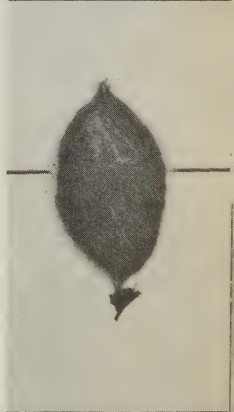


WINTER TWIG



LEAVES

FRUIT (SAMARA),
ENLARGED



CORKY BRANCH

THE HACKBERRIES

HACKBERRY

Celtis occidentalis L.

Bastard elm, sugarberry, nettle-tree.

The hackberry is usually a small tree 25 to 60 feet in height and 1 to 2 feet in diameter. It commonly forms a large bushy crown of ascending branches, but in the open is often flat-topped and spreading. This characteristic, together with its slightly drooping lower branches and elm-like leaves, frequently causes it to be mistaken for an elm.

This species occurs in the St. Lawrence and Ottawa Valleys at Berthierville, Montreal, and Ottawa, and westward in southern Ontario, also at Delta in southern Manitoba. It is not common anywhere in Canada.

It prefers rich moist sites, but will grow on dry, gravelly, or rocky slopes, and limestone outcrops. It is usually found singly among other hardwood species.

. . .

About 70 species of hackberry, *Celtis* L., are found in both the north temperate and tropical regions of the world. They are mostly shrubs or small trees of no economic importance. They belong to the same family as the elms and resemble them in many respects. Only 1 species occurs in Canada.



LEAVES—Alternate, simple, broadly lance-shaped, 2 to 6 inches long, long-pointed, sharp-toothed to the middle or below; dull green and either smooth or rough above, paler and slightly hairy on the veins below.

FLOWERS—May, with or shortly after the leaves; unisexual and bisexual; minute, greenish, solitary or in small clusters; both kinds on the same tree.

FRUIT—September-October; berry-like, dark purple, about 1/3 of an inch in diameter, with edible flesh and containing a single, hard nut; often remaining on the tree over winter.

TWIGS—Slender, zigzag, smooth, reddish-brown, finely chambered at the nodes. No terminal bud; lateral buds up to 1/4 of an inch long, with hairy, chestnut-brown scales.

BARK—Greyish-brown, often covered with wart-like ridges.

WOOD—Heavy, relatively hard and weak, coarse-textured, ring-porous; light yellow with paler sapwood.

The wood of the hackberry is similar to that of the elms, and may be included commercially with the white elm or sold separately. It may be used for cheese boxes and other veneer products, cooperage, furniture, and other utility purposes.

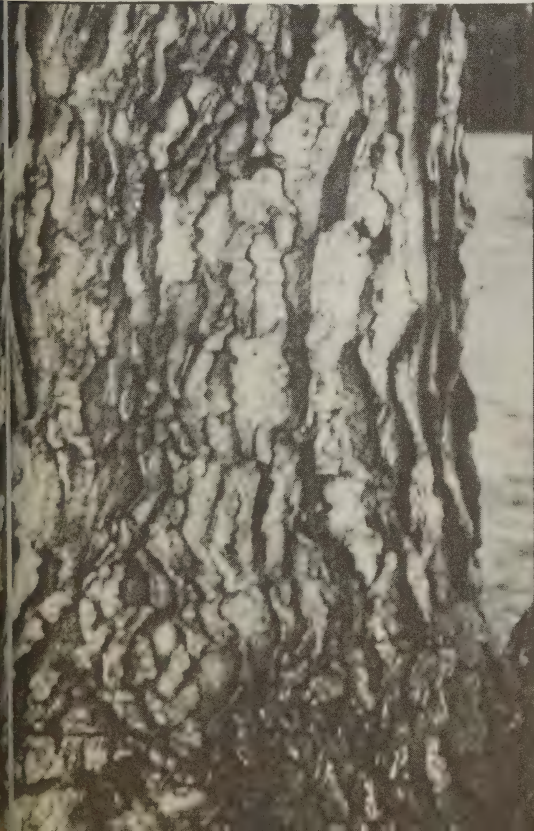
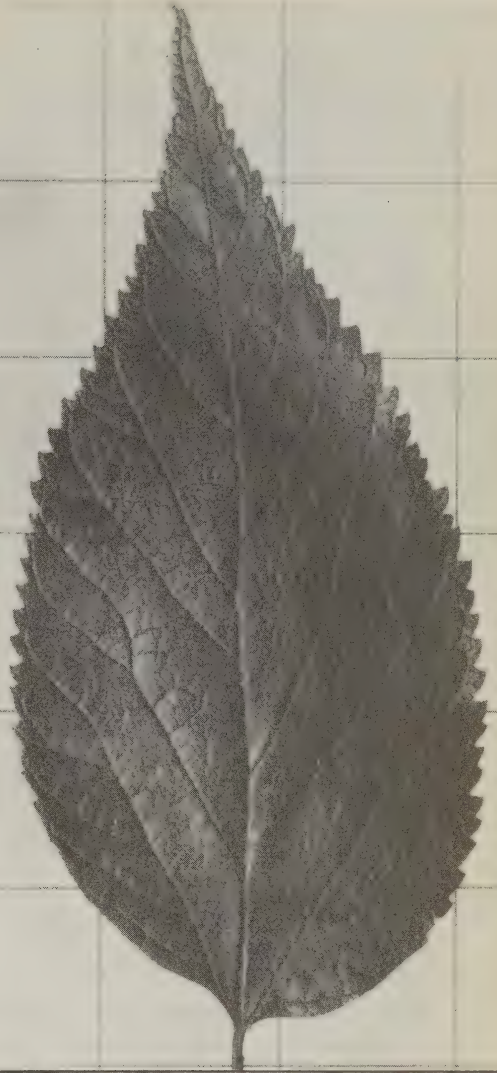
HACKBERRY

◀ WINTER
TWIG

LEAF ▶

MATURE
BARK
▼

FRUIT
▲



RED MULBERRY

Morus rubra L.

Black mulberry, mulberry.

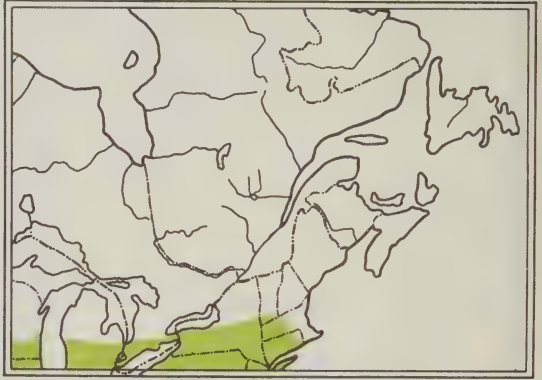
The red mulberry is small, seldom more than 15 to 30 feet in height when grown in the open, where it usually divides near the ground into several stout ascending branches which gradually spread out and form a broad, compact, round-topped crown. The trunk is somewhat longer in the forest and the tree may reach a height of 50 to 60 feet and a diameter of 2 to 3 feet.

This species is found growing naturally in Canada only in the Niagara Peninsula and westward to the Detroit River, but is nowhere a common tree. It prefers a deep moist soil along streams and on low slopes, where it is usually found scattered among other hardwoods. It never forms pure stands.

The red mulberry is easily identified by its rough, coarse-toothed, broadly oval leaves. These are variable in form; some are un-lobed, others have 1, 2, or even 5 lobes.

. . .

This is the only species of mulberry, *Morus* L., native to Canada. The white mulberry, *Morus alba* L., a native of China, has been introduced into Canada and may be found growing wild in southern Ontario. It is best distinguished from the native species by its smooth leaves, smaller buds, and white fruit.



LEAVES—Alternate, simple, broadly oval in outline, coarse-toothed, often variously lobed, 3 to 5 inches long; dark green, more or less rough above, paler, soft and downy below.

FLOWERS—May-June, with or after the leaves; unisexual; in spike-like clusters; male and female on the same or on different trees.

FRUIT—July; a compound aggregate resembling a blackberry, 1 to 1¼ inches long, dark purple at maturity, sweet, juicy, and edible.

TWIGS—Moderately slender, smooth, orange to red-brown, exuding a milky juice when broken. No terminal bud; lateral buds about ¼ of an inch long, rounded or blunt-pointed, slightly hairy, with greenish to brown scales.

BARK—Reddish-brown, separating into long, flaky plates.

WOOD—Heavy, hard, straight-grained, ring-porous; orange-brown with yellowish sapwood.

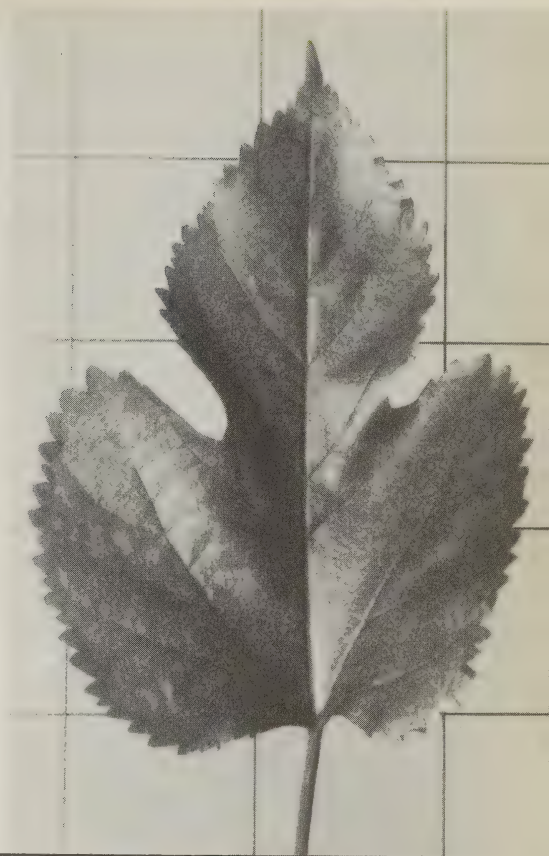
The wood is valued for its durability and may be used for posts, cooperage, and boat-building. The tree is sometimes planted as an ornamental tree and for its berries.

RED MULBERRY

WINTER
TWIG



LEAVES



FRUIT

THE MAGNOLIAS

CUCUMBER-TREE

Magnolia acuminata L.

Magnolia, pointed-leaved magnolia, cucumber magnolia

The cucumber-tree is rare in Canada, and like many other trees which are growing at the northern limit of their range it does not reach a great size here, seldom more than 50 to 70 feet in height and 1 to 2 feet in diameter. Farther south it reaches heights of 90 to 100 feet and diameters up to 4 feet. The trunk is tall and in the forest may be clear of branches for 40 feet or more. Open-grown trees develop broad pyramidal crowns and the slender branches frequently extend down the trunk nearly to the ground.

It is found in Canada only in southern Ontario in the counties bordering on Lake Erie, chiefly on rich soils along streams and on protected hillsides. It occurs singly or scattered in company with white oak, sugar maple, various hickories, and white ash.

The fruit is one of this species' most striking features. It is usually oblong and curved, and when green resembles a cucumber in appearance. When ripe it is dark red in colour and the various sacs or pockets open, releasing the flattened, orange-red seed each contains. The seeds hang suspended by fine white threads, which remain for a time.

. . .

About 35 species of *Magnolia* L. are found in North America, Central America and Eastern Asia. Eight or 9 are native to the United States, one of which extends into Canada.



LEAVES—Alternate, simple, more or less oval in outline, sharp-pointed, toothless, 6 to 10 inches long; yellow-green, smooth above, paler, slightly hairy below.

FLOWERS—May-June, after the leaves; bisexual, bell-shaped, 2 to 3 inches long, greenish-yellow.

FRUIT—Autumn; an oblong, cucumber-like aggregate, 2 to 3 inches long, dull red; seed shed at maturity.

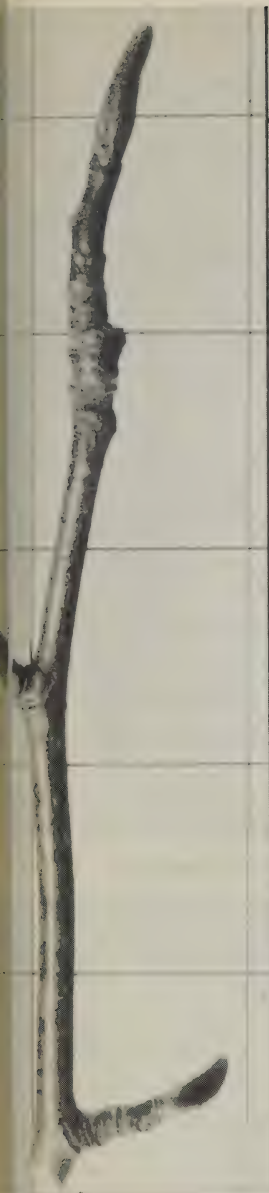
TWIGS—Moderately stout, shiny, bright reddish-brown or grey. Terminal bud $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long, blunt-pointed, covered with silky-white hair. Lateral buds smaller.

BARK—Smooth, greyish-brown; becoming furrowed into long, scaly ridges.

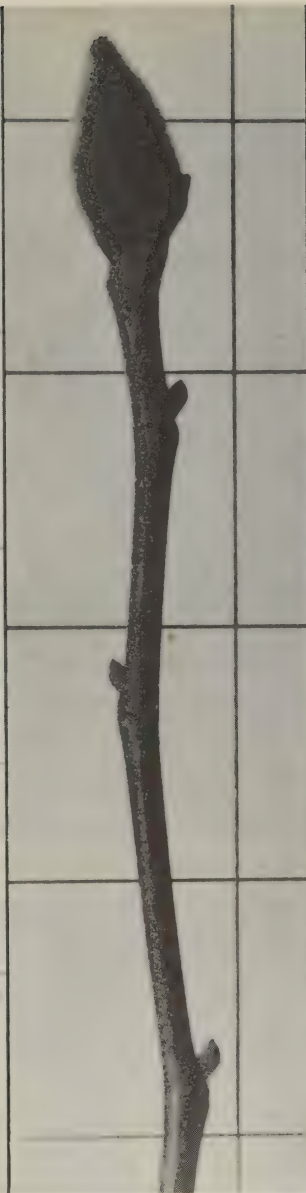
WOOD—Medium heavy, moderately soft, not strong, close-grained, diffuse-porous; yellowish to brown with thin paler sapwood.

This tree is of little economic importance in Canada except for ornamental planting. Its outstanding use is for core-stock.

CUCUMBER-TREE



WINTER TWIG

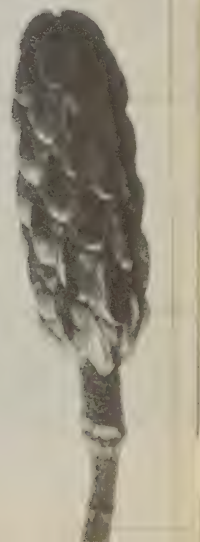


LEAF BUDS
AND
FLOWER BUD



LEAF

FRUIT AGGREGATE



THE TULIP-TREES

TULIP-TREE

Liriodendron tulipifera L.

Yellow-poplar (U.S.), whitewood.

The tulip-tree is the largest hardwood in Eastern North America. It is a stately tree, commonly 50 to 75 feet in height with a diameter of 2 feet or over, sometimes reaching the great height of 175 feet and diameters in excess of 10 feet. It develops a tall massive trunk frequently rising 60 feet or more to the first branch, and on old trees a short wide-spreading crown. The limbs are comparatively short on young or open-grown trees, those near the top usually ascending, those near the bottom declining, and forming a narrow open crown.

It has a very limited range in Canada, being found growing naturally only in southern Ontario from the west end of Lake Ontario to the Detroit River and the south end of Lake Huron. Its preferred habitat is a deep, rich, moist soil along streams, on islands, and around swampy areas, usually mixed with other hardwoods, occasionally with white pine and hemlock. It rarely occurs in pure stands or on a limestone soil.

. . .

Only 2 species of tulip tree, *Liriodendron* L., are known. One is a small tree of Central China, the other is our native species.



LEAVES—Alternate, simple, usually 4-lobed, with a broad, shallow notch in the tip, 4 to 6 inches long; shiny, dark green above, paler below; borne on long slender stems.

FLOWERS—May-June, after the leaves; bisexual; greenish-yellow, cup-shaped, 1½ to 2 inches in diameter.

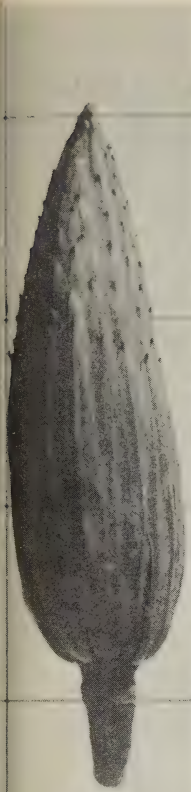
FRUIT—September-October; a 4-angled, winged samara, ½ to 1½ inches long; borne in a cone-like cluster; shed at maturity.

TWIGS—Moderately stout, smooth, shiny, reddish-brown. Terminal bud blunt, flattened, dark red-brown, about ½ inch long; lateral buds smaller, otherwise similar.

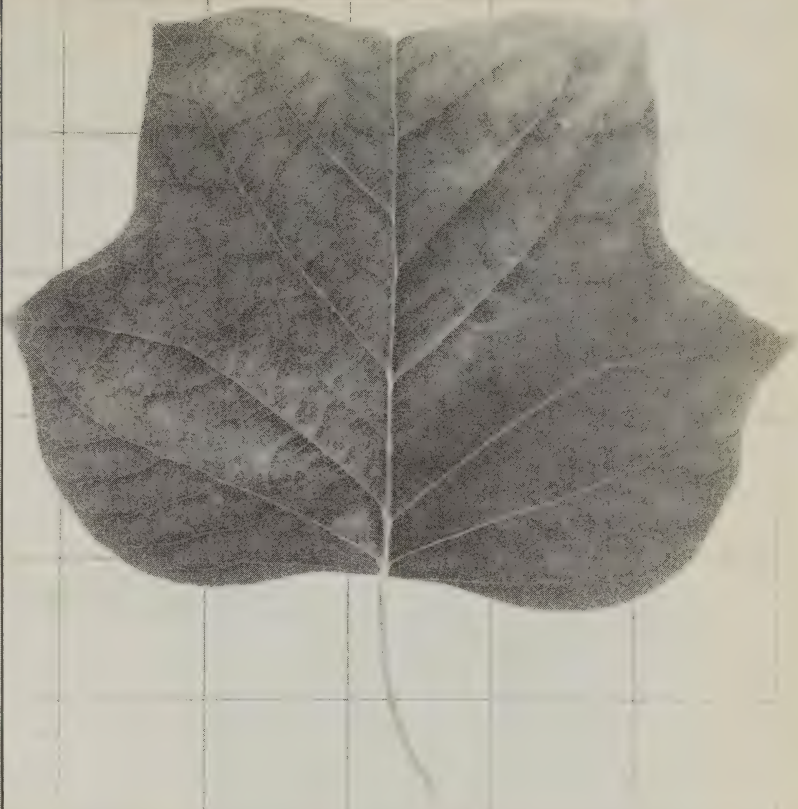
BARK—At first, smooth, dark green; becoming brown, close-furrowed into long rough ridges.

WOOD—Light, soft, not strong, even-textured, diffuse-porous; yellow to brown with almost white sapwood.

It is too rare in Canada to be of much economic importance. Typical use is for core-stock in the manufacture of furniture and fixtures.



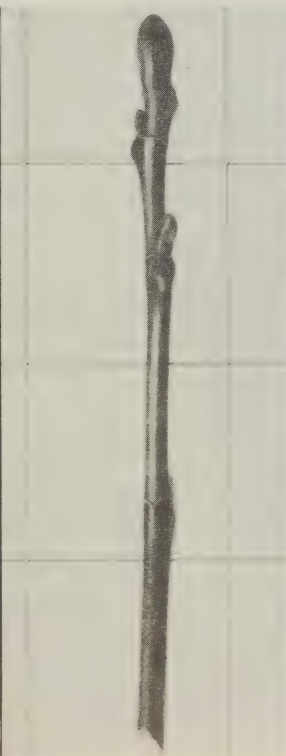
FRUIT CLUSTER



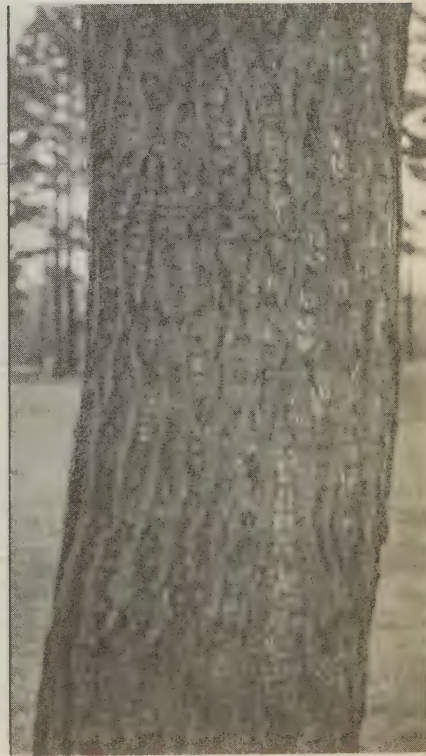
LEAF



FRUIT (SAMARA)



WINTER TWIG



MATURE BARK

PAPAW

Asimina triloba (L.) Dunal

Pawpaw, custard-apple, false banana, jasmine.

The papaw is not a common species in Canada and, when found, is usually in the form of an upright shrub, although under favourable conditions farther south it sometimes reaches a height of 40 feet and a diameter of 12 inches. The tree form develops a straight slender trunk and a long broad crown of slender spreading branches.

In Canada, the papaw is confined to the counties in southern Ontario bordering on Lake Erie. It is usually found on deep, moist soils along streams and on low fertile slopes. It is very tolerant of shade and, for the most part, it forms a part of the undergrowth in rich woodlands.

The tree is easily recognized by its entire leaves, which are pointed at each end and are widest above the middle, its showy purple flowers, and its fruit which suggests a stubby banana.

. . .

The papaws, *Asimina* Adans, belong to a large tropical or subtropical family. Eight species are known, all of them native to North America. One species reaches tree size and is found as far north as southern Ontario.



LEAVES—Alternate, simple, broadest above the middle, sharp-pointed, entire, 6 to 12 inches long; light green, smooth above, paler below.

FLOWERS—May, with the leaves; bisexual; showy, dull purple, about 1½ inches in diameter, with 6 petals.

FRUIT—September-October; a large oblong edible berry, 3 to 5 inches long; greenish-yellow to nearly black.

TWIGS—Slender, more or less hairy, light brown, marked by shallow longitudinal grooves. Terminal bud flattened, coated with rusty-brown hair, about 1/8 of an inch long; lateral buds similar.

BARK—At first smooth, shiny, dark brown with greyish blotches; becoming rough and slightly scaly on very old trunks.

WOOD—Light, soft, weak, ring-porous; yellow tinged with green.

Papaw wood has no commercial value. The fruit is gathered for food and frequently appears on the market where the tree occurs, but it is not grown commercially. The tree is sometimes planted for decorative purposes.



WINTER TWIG



LEAF

SASSAFRAS

Sassafras albidum (Nutt.) Nees

Sassafrax, saxifrax.

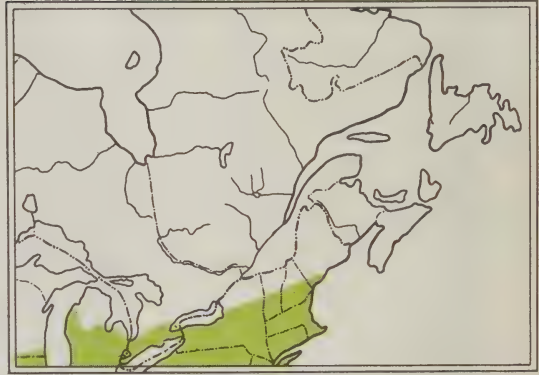
The sassafras is a medium-sized tree 30 to 40 feet in height and 12 to 18 inches in diameter, sometimes larger, but on dry sandy sites often reduced to a shrub growing in thickets. The trunk is short and stout, and soon divides into a large number of abruptly spreading branches. The crown is usually flat-topped, open, and irregular, and is composed of many stout brittle limbs which are more or less contorted. The base of the tree is frequently surrounded by a thicket of young shoots which have sprung up from the roots.

The Canadian range of this tree is limited to southern Ontario, from the vicinity of Toronto westward to the southern end of Lake Huron. It prefers a rich sandy loam, but may be found on a variety of sites, along fences and roadsides, on abandoned farms, and in hardwood forests. It is quite tolerant of shade.

The bark, twigs, and leaves of the sassafras all have a peculiar strong aromatic taste and smell, which enable one to identify it at once.

. . .

Three species of sassafras, *Sassafras* Trew, are known, 1 in North America and 2 in China and Formosa.



LEAVES—Alternate, simple, oval in outline, blunt-pointed, entire, often 2- to 3-lobed, 3 to 6 inches long, smooth; bright green above, paler, smooth or slightly hairy below.

FLOWERS—May, with the leaves; unisexual; greenish-yellow, in loose tassel-like clusters; male and female on separate trees.

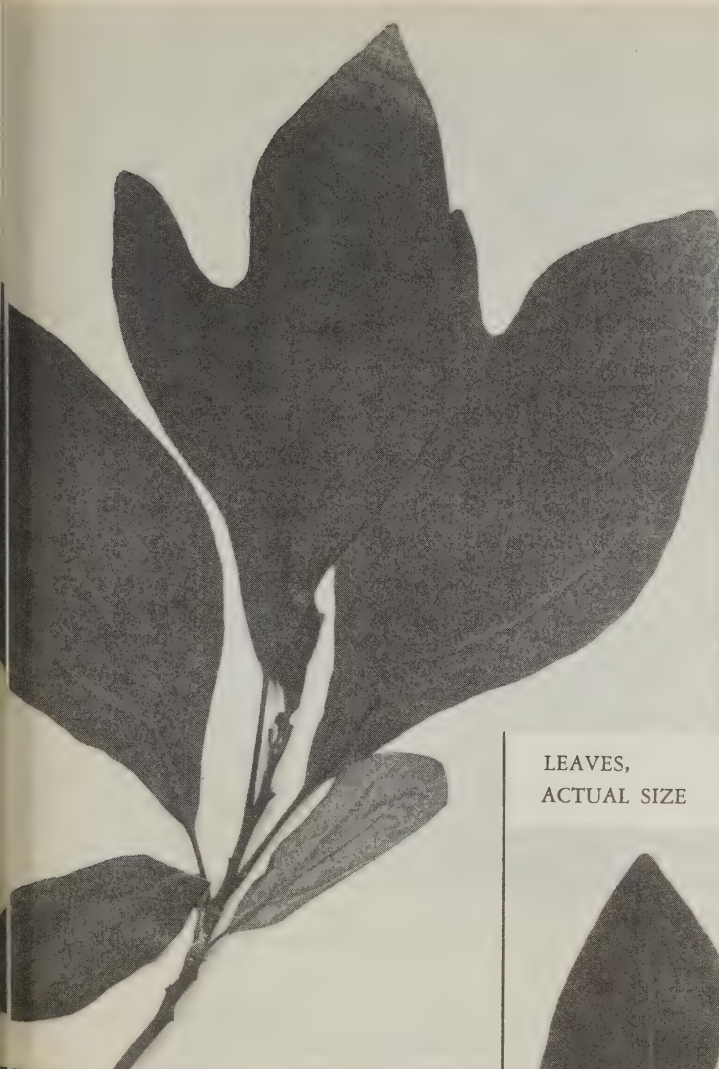
FRUIT—September-October; dark blue, oval, 1-seeded, berry-like, about $\frac{1}{2}$ inch long, borne on a stout, red, fleshy, club-shaped stalk; falling soon after maturity.

TWIGS—Moderately stout, smooth, shiny, bright green. Terminal bud green, sharp-pointed, $\frac{1}{3}$ to $\frac{3}{5}$ of an inch long; lateral buds smaller.

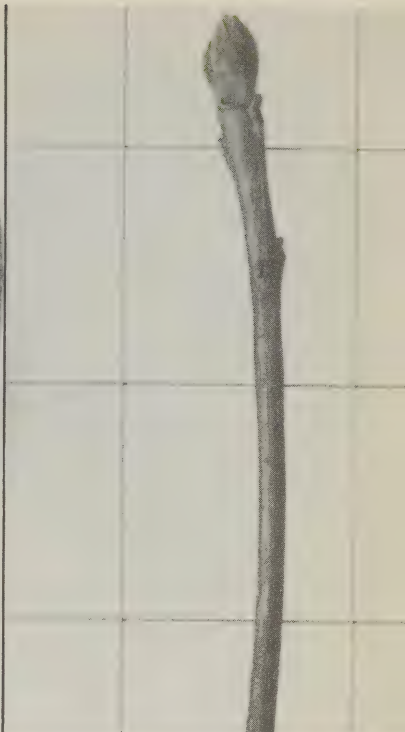
BARK—On young stems, thin, reddish-brown, shallow-fissured; on old trunks thick, soft, deeply furrowed into broad, flat, scaly ridges.

WOOD—Light, soft, weak, coarse-grained, ring-porous; orange-brown with thin yellow sapwood.

The sassafras is sometimes sawn into lumber and used for cabinet-work in Canada. The wood is soft, has a pleasing grain and figure, and is pleasantly aromatic. The oil of sassafras used in soap and perfumes comes from this tree.



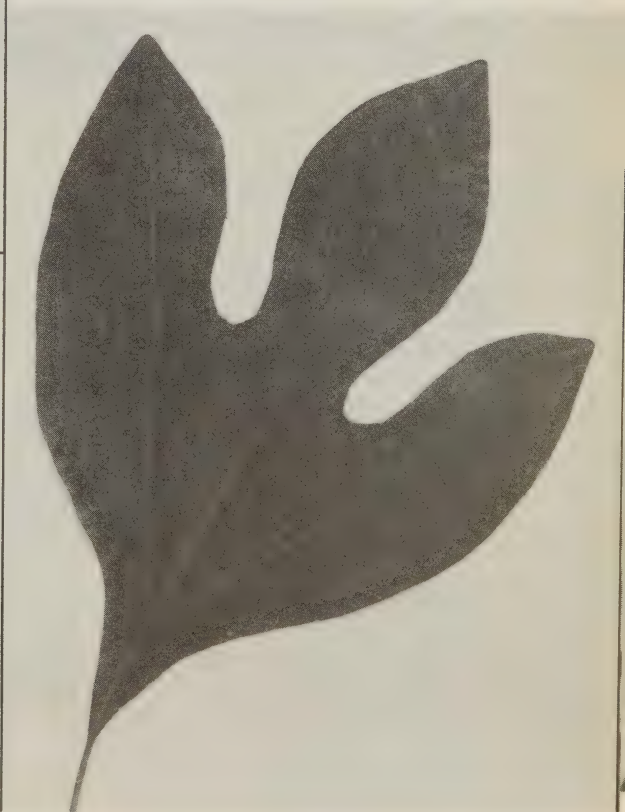
LEAVES,
ACTUAL SIZE



WINTER TWIG



FRUIT



LEAF, ACTUAL SIZE

THE WITCH-HAZELS

WITCH-HAZEL

Hamamelis virginiana L.

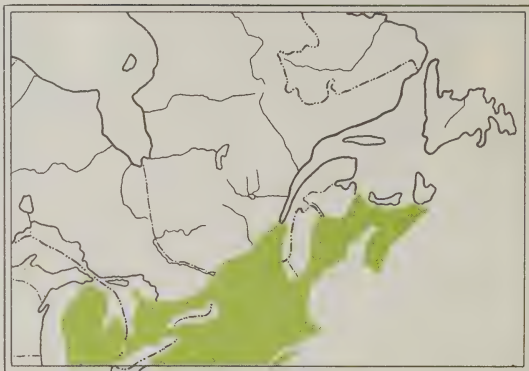
Winter-bloom, snapping-hazel.

The witch-hazel is sometimes a small tree 20 to 25 feet in height and 6 inches or more in diameter, with crooked spreading branches and an irregular crown. More often, it is a shrub growing in thickets or clumps on moist sites in ravines and on shady hillsides. It is found from Nova Scotia westward throughout the southern portions of Quebec and Ontario.

This species is unique in Canada because of its habit of flowering in the autumn when the leaves are falling. The flowers come out in small golden-yellow clusters which have the appearance of a tangled mass. The individual flower with its 4 long, twisted petals is small and spidery-like.

The fruit is a peculiar brown woody 2-celled capsule about the size of a large pea which, when it ripens in October, 1 year after fertilization, splits open in 4 directions and expels the seeds to some distance. The dried empty pods remain on the tree over winter and, with the flowers, are features which enable the witch-hazel to be distinguished from any other species with which it is liable to be confused.

Six species of witch-hazel, *Hamamelis* L., are known, 3 in North America and 3 in Asia. Only 1 occurs in Canada. They are all small trees of little economic importance.



LEAVES—Alternate, simple, oval in outline, 3 to 6 inches long, rounded or short-pointed, irregularly wavy-toothed; dark green above, paler below.

FLOWERS—September-October; bisexual; 1 to 1½ inches in diameter with long golden-yellow petals; usually borne in clusters of 3.

FRUIT—October; a 2-celled brownish pod or capsule, about ½ inch long; opening at maturity and forcibly ejecting the 2 shiny black seeds.

TWIGS—Slender, more or less downy, orange-brown. Terminal bud stalked, slender, often curved, 1/5 to ½ inch long, without scales, and covered with yellowish-brown hair; lateral buds smaller, otherwise similar.

BARK—Smooth or slightly scaly, light brown, often mottled. Inner bark reddish-purple.

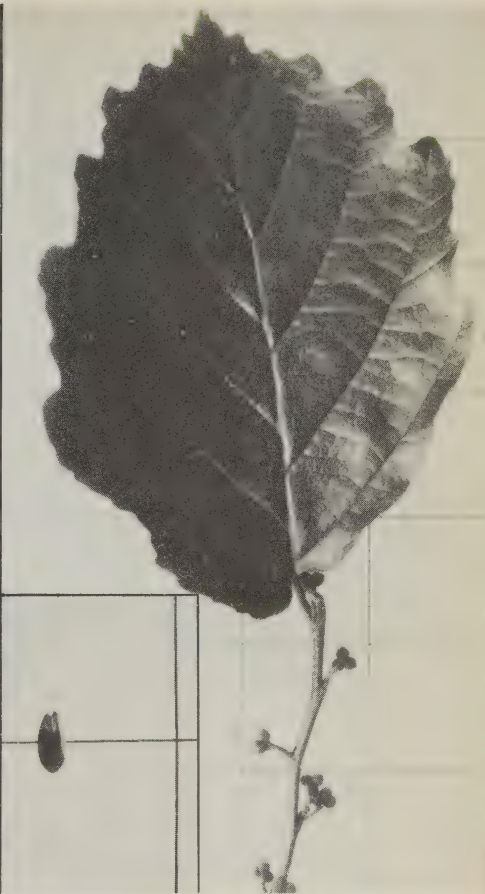
WOOD—Heavy, hard, diffuse-porous; light brown with thick, almost white sapwood.

Witch-hazel wood is not used commercially in Canada. The bark, leaves, and twigs are astringent and when distilled with alcohol yield the extract of witch-hazel, frequently used to stop bleeding and prevent inflammation.

WITCH-HAZEL

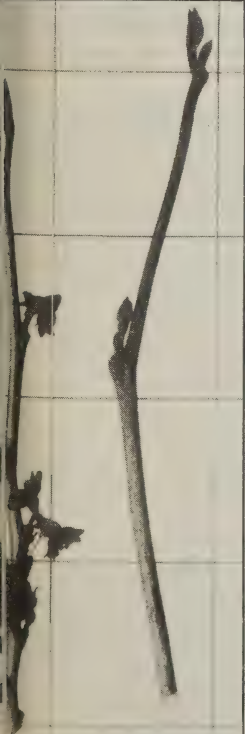


OPENED FRUIT PODS

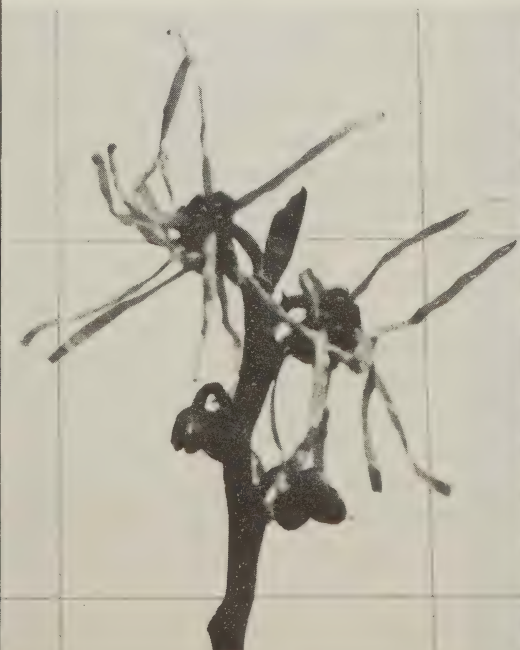


SEED

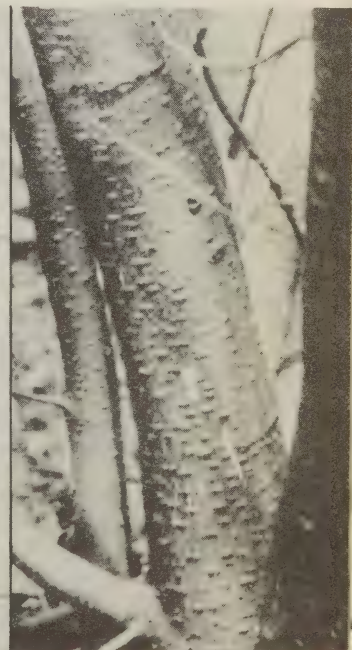
LEAF AND
FLOWER BUDS



WINTER TWIGS



FLOWERS



BARK

SYCAMORE

Platanus occidentalis L.

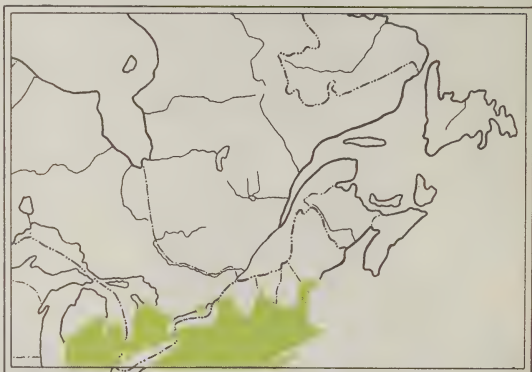
Button ball, buttonwood, plane-tree.

The sycamore under favourable conditions sometimes reaches a diameter of 7 or 8 feet, but the average is not more than 2½ to 3 feet. The height is about 100 feet. The trunk is usually short and irregular in form. The crown is large and wide-spreading when growing in the open. The limbs are large and very irregular in the way they branch and grow out from the trunk. The root system is generally shallow and spreads just below the surface.

This tree may be distinguished readily by its habit of shedding its brown outer bark in large patches, leaving the cream-white inner bark exposed.

The species is found naturally in Canada only in southern Ontario. It has, however, been successfully planted as far north as the City of Ottawa. In the forest, this tree is confined to rich bottomlands along streams and around lakes. It never forms pure stands, but is always scattered or in small groups.

Six or 7 species of sycamore, *Platanus* L., are recognized. They are found in parts of North America, Asia Minor, and southwestern Asia. Of the 3 native to North America, only 1 occurs in Canada.



LEAVES—Alternate, simple, with 3 to 5 shallow lobes; 4 to 8 inches long and about as wide, sharp-pointed, coarse-toothed or rarely entire; bright green above, paler below.

FLOWERS—May, with the leaves; unisexual; minute, in dense rounded heads; male dark red, female light green, both on the same tree.

FRUIT—Late autumn; in a globose head, 1 to 1¼ inches in diameter, composed of numerous hairy nutlets tightly packed together, often remaining on the tree until mid-winter.

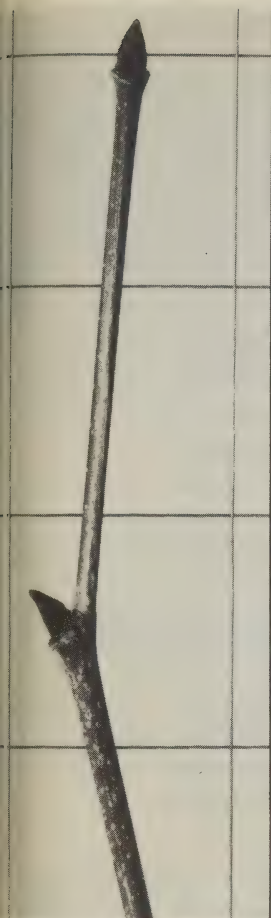
TWIGS—Moderately stout, smooth, shiny, zigzag, orange-brown. No terminal bud; lateral buds 1/8 to 3/8 of an inch long, conical, with a single cap-like scale, dark reddish-brown, and diverging from the twig.

BARK—On young stems smooth, reddish-brown, mottled with white, yellow, or green patches; on old trunks dark brown, scaly, deeply furrowed into broad rounded ridges.

WOOD—Medium heavy, moderately hard, not strong, coarse-grained, diffuse-porous; light to dark brown with paler sapwood.

The sycamore is not of great economic importance. It is used to some extent for cabinet-work, largely for concealed parts such as drawers and framing, and for interior finishing when quarter-sawn.

SYCAMORE



WINTER TWIG

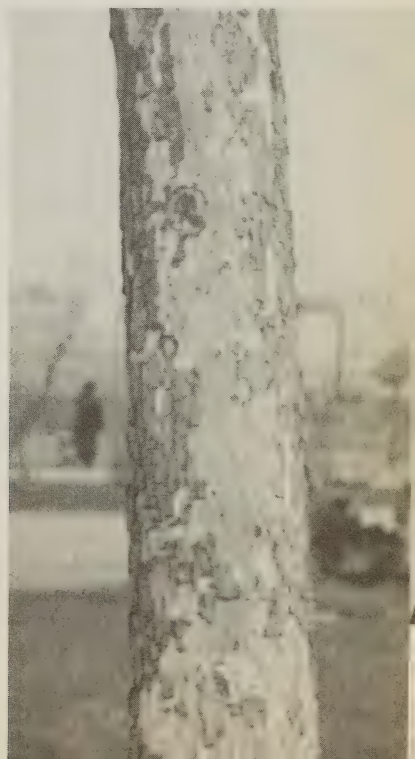


LEAF



◀ FRUIT

MATURE
BARK ▶



The APPLES *Malus* Mill.

The apples, cherries, plums, hawthorns, serviceberries, and mountain ashes are all members of the rose family of which the apples are well-known and widely distributed representatives. About 25 species of apple are known, but only 2 of these, the sweet crab-apple, *Malus coronaria* (L.) Mill., native to southern Ontario, and the Pacific or Oregon crab-apple, *Malus fusca* (Raf.) Schneid., of the west coast of British Columbia are native to Canada. The common apple, *Malus pumila* Mill., has been introduced into Canada for its fruit and is now naturalized under the name of wild apple in many parts of the country. It is the parent of many of the present-day cultivated apples.

The apples are deciduous shrubs or trees of little importance as timber producers, but are valued for their fruit and are sometimes planted for decorative purposes. They have alternate, simple, toothed leaves, often lobed, especially those near the tips of the branches; small ovoid buds with overlapping scales; reddish to greyish-brown scaly bark. The fragrant white to pink flowers are bisexual and appear in clusters with the leaves on short, spur-like branchlets. The fruit — technically a pome — is the well-known apple, distinguished by a sunken stem end, sweet to sour, edible, homogeneous flesh and containing several seed cavities near the centre. It matures in one growing season. Apple wood is hard, heavy, fine-textured, diffuse-porous, and a light reddish-brown in colour. It is sometimes used for carvings, engraving blocks, pattern making, tool handles, and small turnery. The twigs when used as pulp produce a high-quality cigarette paper.

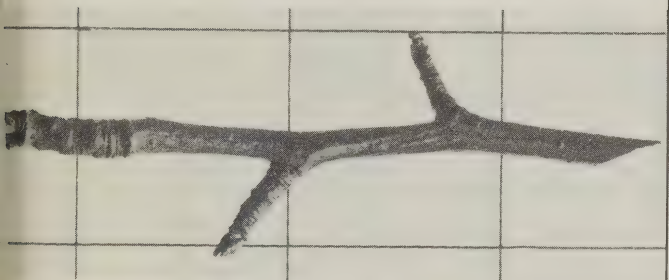
The sweet crab-apple is a small tree up to 30 feet in height and 14 inches in diameter with a short trunk and stout spreading limbs forming a round-topped crown. It is distinguished by irregular-toothed, often lobed, leaves, nearly smooth below; rosy-white flowers, 1½ to 2 inches in diameter; yellow-green fruit, sour but edible; smooth or slightly hairy twigs; nearly smooth, bright red buds; smooth or fissured reddish-brown scaly bark. It commonly grows in thickets.

The Pacific crab-apple is a tree up to 40 feet in height and 18 inches in diameter. It has sharp-toothed, often slightly lobed, leaves; at first hairy, later shiny red twigs; yellow, flushed with red, or nearly red fruit.

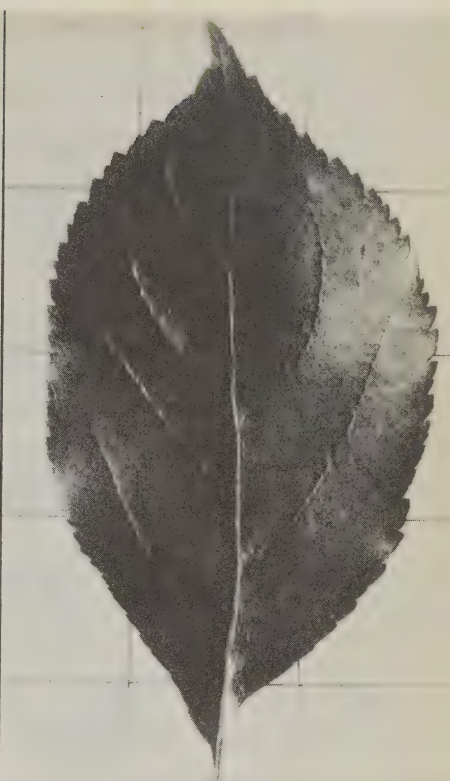
The common or wild apple reaches heights of 50 feet and diameters of 2 feet or more with a short trunk and a broad rounded crown of stout, spreading branches. The leaves are entire or irregular-toothed with short rounded teeth, are never lobed, and are covered below with soft, grey hair. The leaf-stems and buds are also quite hairy. The greyish-brown bark is thin and scaly. The many varieties of this species are chiefly distinguished by variations in their fruits rather than by differences in leaves, twigs, flowers, and bark.



WILD APPLE FRUIT



PACIFIC CRAB-APPLE SPUR SHOOTS



WILD APPLE LEAF



PACIFIC CRAB-APPLE LEAF



WILD APPLE FLOWERS

The mountain-ashes are a large group of deciduous shrubs and small trees with a wide distribution throughout the Northern Hemisphere. More than 80 species have been described, of which 6 are native to Canada. Only 2 of these, the American mountain-ash and the showy mountain-ash regularly reach tree size. They are confined to Eastern Canada. The other 4 species, *Sorbus scopulina* Greene, *Sorbus canadensis* G. N. Jones, *Sorbus sitchensis* Roem., and *Sorbus occidentalis* (Wats.) Greene are shrubs occurring only in the West. The European mountain-ash, rowan tree or rowan berry, *Sorbus aucuparia* L., has been frequently planted in Canada as an ornamental tree and is locally naturalized from Labrador to British Columbia.

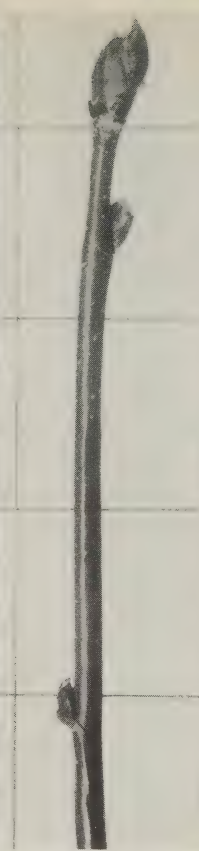
The Canadian mountain-ashes are distinguished by their alternate, compound leaves; thin toothed leaflets, in one species almost entire; stout twigs; and large terminal buds with overlapping scales, which may be either smooth or hairy. The flowers are white, contain both pistils and stamens, and are borne in broad, rounded, or flat-topped clusters. The fruit is small, ranging from $\frac{1}{5}$ to $\frac{1}{2}$ inch in diameter, it is a bright red to orange-red in colour, and resembles a very small apple. The bark is thin and smooth on young stems, smooth or sometimes scaly on old trunks.

The European mountain-ash, when found growing in a wild state, is sometimes mistaken for the showy mountain-ash, or it may be classed as a hybrid between that species and the American mountain-ash. It is a small tree 18 to 40 feet in height with stout spreading branches, and smooth greyish or greenish-grey bark. The leaves are alternate, compound, 6 to 10 inches long, composed of 11 to 15 short-pointed coarse-toothed leaflets dull green above, paler and usually covered with a soft whitish down below. The flowers are white. The winter buds are large, never gummy, and are more or less coated with white (rarely reddish-yellow) hairs. These white hairy, non-gummy buds are the best means of quickly distinguishing the European mountain-ash from the Canadian tree species.

THE MOUNTAIN-ASHES



HYBRID MOUNTAIN-ASH
LEAVES AND FLOWERS



EUROPEAN
MOUNTAIN-ASH
WINTER TWIG



EUROPEAN MOUNTAIN-ASH
COMPOUND LEAF



EUROPEAN MOUNTAIN-ASH FLOWERS



EUROPEAN MOUNTAIN-ASH
BARK

SHOWY MOUNTAIN-ASH

Sorbus decora (Sarg.) Schneid.

Rowan tree, rowan berry, mountain-ash, service tree.

The showy mountain-ash with its large clusters of white flowers and bright red or scarlet fruit is one of the most conspicuous trees in the northeastern forests. It is usually a small, often bushy tree, 15 to 35 feet in height and 4 to 12 inches in diameter, but may on suitable sites attain a height of over 75 feet and a diameter of 20 inches, with a long clear bole and a short rounded crown.

This species ranges from the Atlantic Coast westward into Manitoba; it is commonly found on moist sites along the banks of streams, around lake shores, on the margins of swamps, and in cool mountain woods. It is a familiar sight in old pastures and along fences. It grows singly or in small clumps with red maple, red ash, yellow birch, and other moisture-loving species in the woodlands of the south, and with balsam fir, white spruce, black spruce, and white birch farther north. In the spruce-fir forests of boreal Canada it is frequently reduced to a low shrub and shares the forest understory with mountain maple and green alder.



LEAVES—Alternate, compound, 5 to 10 inches long, composed of 11 to 15 leaflets borne in pairs on a stout grooved stem. Leaflets oblong in shape, rounded at the base, rounded or blunt-pointed at the tip, coarse-toothed to the middle or below, $1\frac{1}{2}$ to 3 inches long; blue-green above, paler and occasionally slightly hairy below.

FLOWERS—June, after the leaves; bisexual, white, about $\frac{1}{2}$ inch in diameter; borne on slightly hairy stems in broad, flat-topped clusters.

FRUIT—August; rounded, berry-like, between $\frac{1}{4}$ and $\frac{1}{2}$ inch in diameter, scarlet or vermilion; often remaining on the tree over winter.

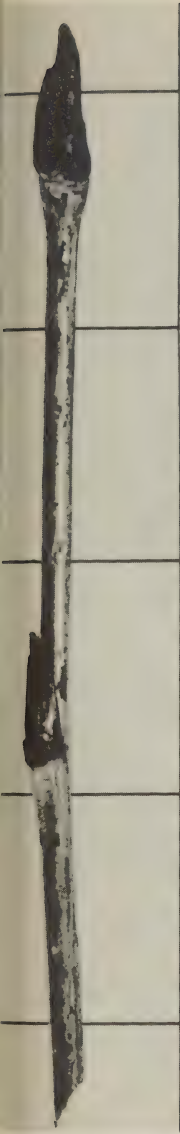
TWIGS—Stout, smooth, greyish-brown, with a few scattered lenticels. Terminal bud large, conical, about $\frac{1}{2}$ inch long, the outer scales smooth, gummy, dark purplish red, the inner scales somewhat hairy on the margins, lateral buds smaller.

BARK—Thin, greyish-brown, smooth on young stems; dark grey, almost smooth or covered with loose papery scales on old trunks.

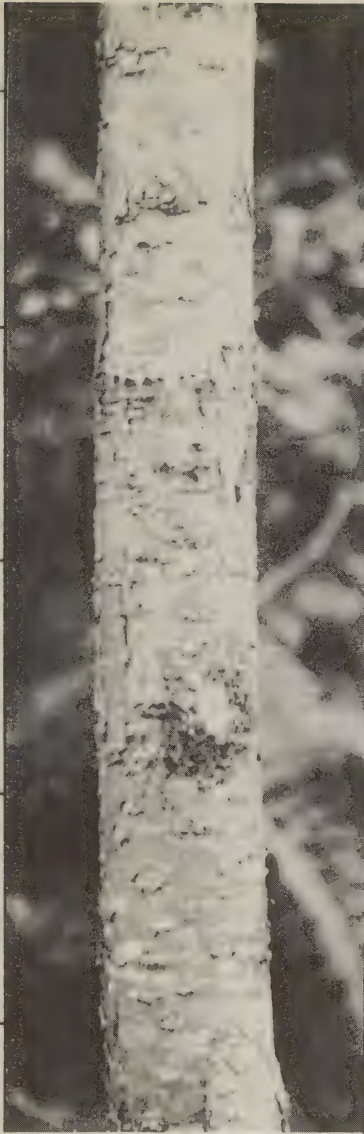
WOOD—Light, soft, weak, close-grained, diffuse-porous; pale brown with lighter coloured sapwood.

The showy mountain-ash is of no importance as a timber tree. It is sometimes planted for ornamental purposes and in winter the fruits provide food for birds.

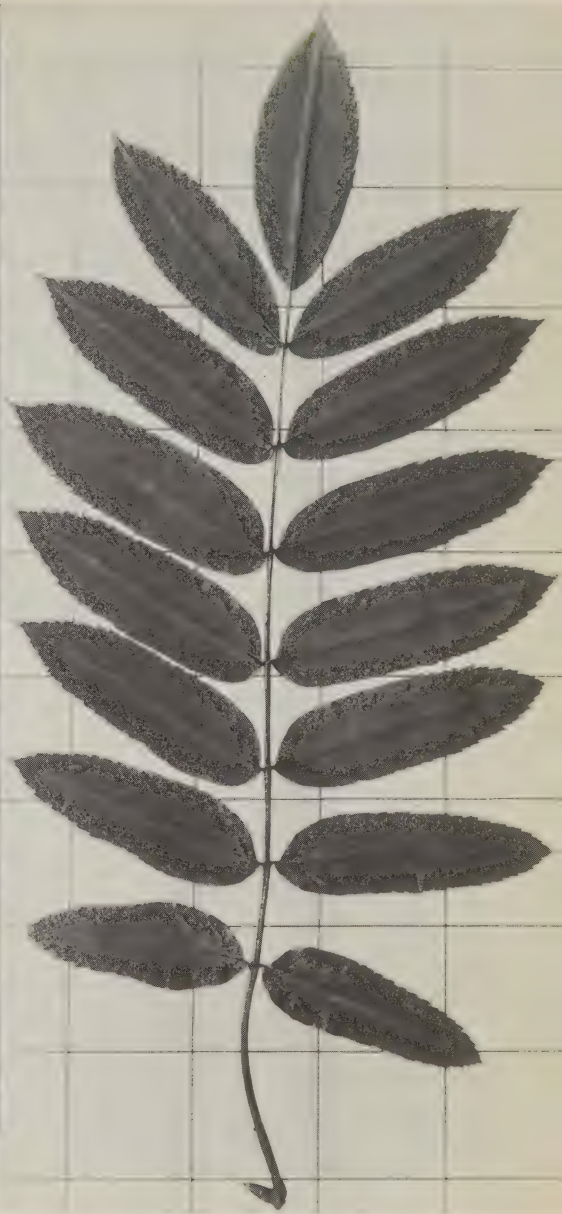
SHOWY MOUNTAIN-ASH



INTER TWIG



YOUNG BARK



COMPOUND LEAF



MATURE BARK

THE MOUNTAIN-ASHES

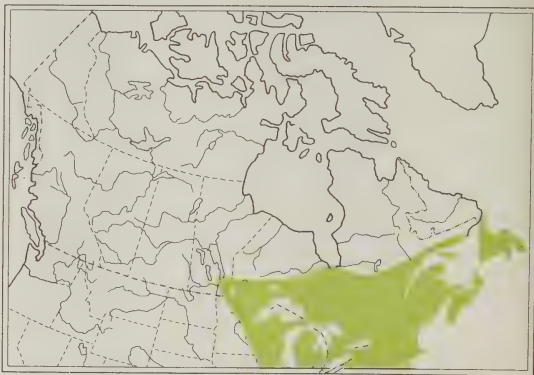
AMERICAN MOUNTAIN-ASH

Sorbus americana Marsh.

Rowan tree, rowan berry, mountain-ash, service tree.

The American mountain-ash is a small tree, often bushy and shrub-like with several stems rising from the same root system, 10 to 30 feet in height and 4 to 10 inches in diameter. The trunk is usually short. The crown of stout, ascending branches is round-topped and open. This species can be most easily separated from its close relative, the showy mountain-ash, by its smaller flowers and fruits, and narrow, lance-shaped fine-toothed leaflets. The flowers appear about ten days earlier than those of the showy mountain-ash.

In Canada it is found from the Atlantic Coast to the south end of Lake Winnipeg in Manitoba. It prefers rich open sites with an abundance of moisture, but it is also found on thin soil over rock ledges and on stony hillsides. It never grows in pure stands, but is found either singly or in small clumps along the borders of lakes and streams, the margins of swamps, and in damp woods.



LEAVES—Alternate, compound, 6 to 10 inches long, composed of 11 to 17 leaflets borne in pairs on a moderately stout stem. Leaflets lance-shaped, rounded to wedge-shaped at the base, sharp-pointed at the tip, fine-toothed almost to the base, 2 to 3½ inches long; bright green above, paler and rather slightly hairy below.

FLOWERS—May-June, after the leaves, bisexual, white, about ¼ of an inch in diameter; borne in broad flat-topped clusters.

FRUIT—August, rounded, berrylike, about ¼ of an inch in diameter, bright red, glossy; often remaining on the tree over winter.

TWIGS—Stout, smooth, occasionally slightly hairy, reddish-brown, spotted with numerous lenticels. Terminal bud large, conical, about ½-inch long, with gummy, dark purplish-red, smooth or slightly hairy scales; lateral buds smaller.

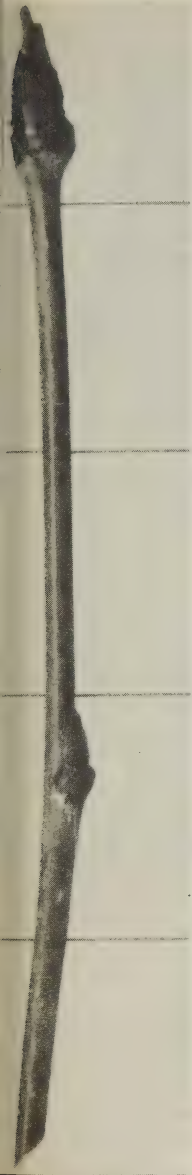
BARK—Thin, smooth, reddish-brown on young stems; light grey, smooth or with a few loose scales on old trunks.

WOOD—Light, soft, weak, close-grained, diffuse-porous; pale brown with lighter coloured sapwood.

This species has no importance as a timber tree. It is often used in ornamental plantings, but is neither as handsome nor as hardy as the showy mountain-ash. In the past, the fruit and inner bark were sometimes used for medicinal purposes. The fruit is a favourite for many species of autumn and winter birds.

AMERICAN MOUNTAIN-ASH

WINTER
TWIG



COMPOUND
LEAF



FRUIT
CLUSTER



FLOWERS



The SERVICEBERRIES *Amelanchier* Medic.

The serviceberries form a genus of not more than 24 species of slender shrubs and small trees. Eighteen species are found in North America, of which 13 occur in Canada. Only 2 of the Canadian species, the downy serviceberry, *Amelanchier arborea* (Michx.f.) Fern., and the Allegheny serviceberry, *Amelanchier laevis* Wieg., regularly attain the status of a small tree. Two other species, the Saskatoon, *Amelanchier alnifolia* Nutt., and the Pacific serviceberry, *Amelanchier florida* Lindl., are generally shrubs but occasionally on very good sites reach tree size.

The serviceberries, also known as the juneberries, shad-bushes, and, in the West, the Saskatoons, are deciduous species with simple alternate leaves and slender unarmed twigs. The bark is generally smooth on young stems, smooth or somewhat roughened and often scaly on older trunks. The winter buds are a useful distinguishing characteristic. They are long, slender, sharp-pointed, and covered with numerous overlapping scales. In form and appearance they might be mistaken for those of the beech but, as a rule, are pressed close to the twig and never stand out at the wide angle so characteristic of beech buds. The terminal bud is usually larger than the lateral buds.

The shape, size, and other details of the leaves, although characteristic of the genus as a whole, are not always reliable means of separating the species. Frequently the variation is greater within a species than between 2 individual species. The leaves are simple, usually sharp-toothed but sometimes entire, mostly oval, widely elliptical or heart-shaped in outline, and seldom exceed 3 inches in length.

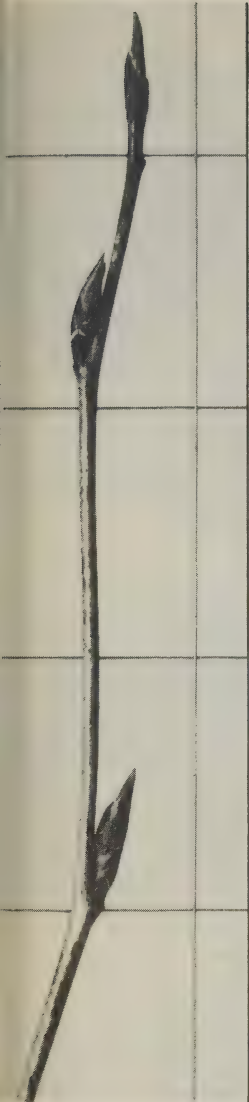
The flowers, which are white and perfectly bisexual, appear in the spring before or with the leaves. They are usually borne in clusters, sometimes in such dense masses that the branches appear to be covered with them. The fruit—technically a pome—is small, sweet, berry-like, and edible. It matures in one season, and is usually marked on top by the remains of the flowers.

The downy serviceberry is distributed throughout southern Quebec and southern Ontario, and may occur in southern New Brunswick. It occasionally reaches heights of 40 to 50 feet and diameters of 18 to 20 inches. The bark is smooth, grey, and often striped on young stems, slightly fluted and greyish-brown on old trunks. The leaves are mostly oval in outline, sharp-pointed, and have either heart-shaped or, rarely, rounded bases. They are covered with dense white down at first, becoming nearly smooth at maturity. The rather dry and tasteless fruit is about $\frac{1}{3}$ of an inch in diameter, dark purple in colour, and usually falls early in the season.

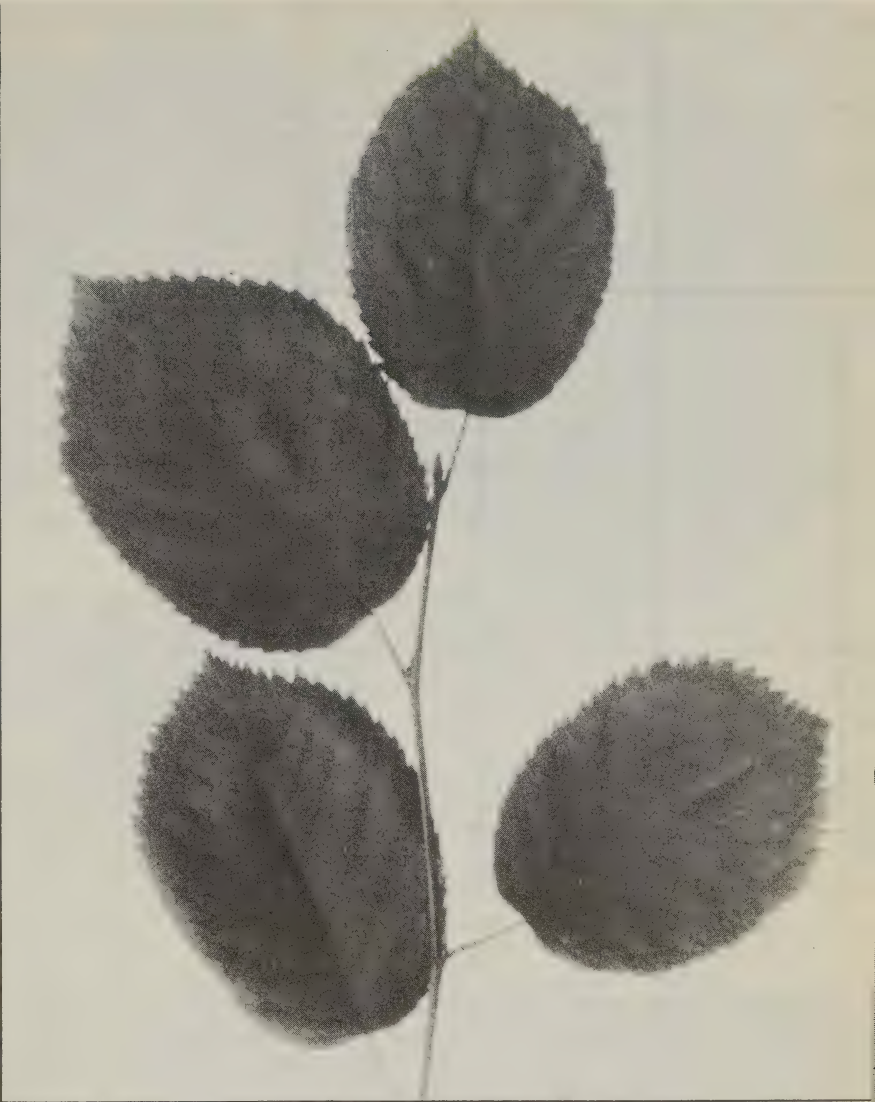
The Allegheny serviceberry is found throughout the Maritime Provinces, southern Quebec, and in southern Ontario as far west as Lake Superior. It rarely exceeds 20 feet in height. Its leaves are either smooth or nearly smooth from the first, often tinged with purple when young, and are usually rounded, very rarely heart-shaped, at the base. The flowers are somewhat larger and the fruits are sweeter than those of the downy serviceberry.

The wood of the serviceberries is hard and heavy. It is sold in small quantities as lancewood for fishing rods. Several of the species are used for ornamental planting and as grafting stock for the pear and quince.

THE SERVICEBERRIES



WINTER TWIG



LEAVES



FLOWERS

The HAWTHORNS *Crataegus* L.

Several hundred species of hawthorn have been described by botanists. Twenty-five or more are found in Canada, of which the greater number occur in the southern portion of the Eastern Provinces. Only 2 species, the black hawthorn, *Crataegus douglasii* Lindl., and the Columbia hawthorn, *Crataegus columbiana* Howell, are found in British Columbia. Many of the eastern species have an extremely small range. Probably the most widely distributed is the roundleaf hawthorn, *Crataegus chrysocarpa* Ashe, found from Nova Scotia to Saskatchewan and possibly Alberta.

There is no group of trees in Canada in which it is more difficult to separate the various species. The group is so large, and so closely related are many of the species, that only one who has the time to make a special study of hawthorns can hope to distinguish them all. The points of distinction relied upon are found mainly in the flower and the fruit. It is beyond the scope of a book of this nature to take up their minute differences.

In habit the hawthorns are usually low, wide-spreading, bushy trees, frequently found growing as shrubs in thickets. Within their range they are common along country roadsides, in fence corners, old pastures, and in open places in the woodlot. They are not exacting, but prefer rich, moist, well-drained soils.

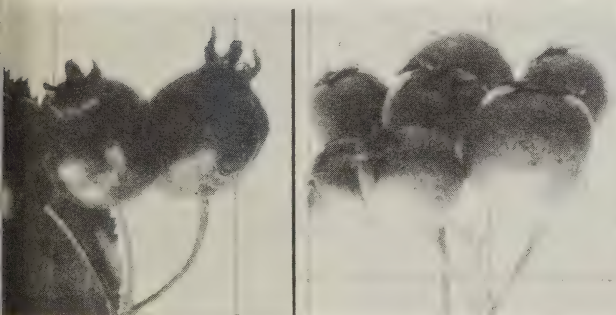
The group can be readily distinguished from other trees by their somewhat zigzag twigs, which are usually well armed with long thorns. These thorns occur just above the point at which the leaf is attached and are commonly unbranched and exceedingly sharp. The thorns attached to the trunk and larger branches are frequently branched. The winter buds are small, shiny, chestnut-brown, rounded, and covered with numerous overlapping scales. The leaves are alternate, simple, generally toothed, and usually lobed. The white or rarely pink flowers are bisexual and are borne in showy clusters on the tips of short, leafy branches. The fruits, or haws, as they are sometimes called, resemble tiny apples when ripe. They are edible, but as a rule the proportion of bony seed to pulp is so great that they are hardly worth gathering. They sometimes remain on the tree all winter.

The wood is not commercially important. It is heavy and hard, and is sometimes used for small turnery such as handles, mallets, and wooden novelties.

A European species, the one-seeded hawthorn, *Crataegus monogyna* Jacq., often erroneously referred to as the English hawthorn, has been introduced into Canada and is now naturalized in many parts of the country from Nova Scotia westward. The true English hawthorn, *Crataegus oxyacantha* L., the hawthorn or may of English literature, is cultivated here, but so far has not been reported as being naturalized. Both species have deep-lobed leaves.



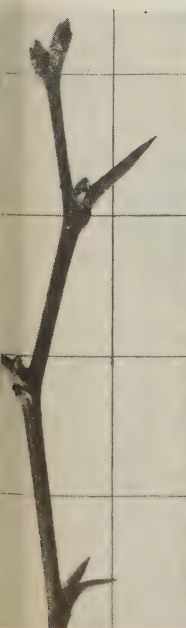
LEAVES



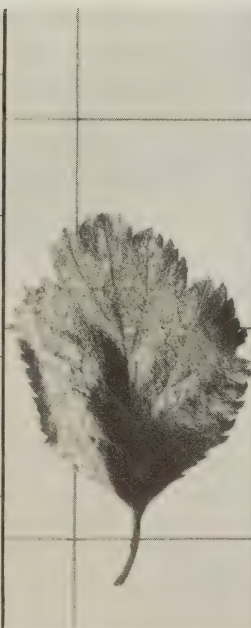
FRUIT



BLACK HAWTHORN LEAF



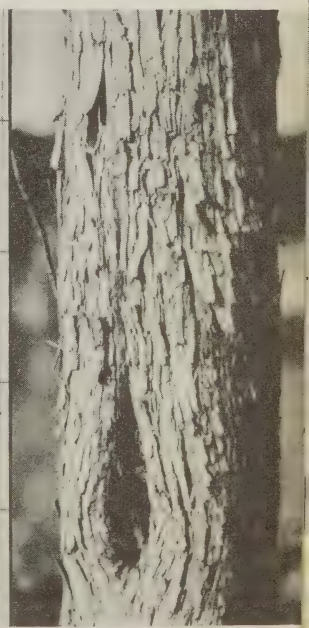
INTER TWIG



LEAF



WINTER TWIG



MATURE BARK

The CHERRIES AND PLUMS *Prunus* L.

Nearly 200 species of this well-known group, which includes the peaches, apricots, and almonds, as well as the cherries and plums, have been described. Between 25 and 30 species are known in North America, but only 7 of these, 5 cherries and 2 plums, are native to Canada. One species, the sand cherry, *Prunus pumila* L., is a low, often prostrate shrub. Five more, the pin, choke, and bitter cherries, and the Canada and wild plums are small often bushy and spreading trees or large shrubs of no economic importance in the forest. Only 1 species, the black cherry, is of sufficient size to be valued for the timber it produces.

The Canadian representatives of this genus are known by their slender branches, which often develop short spur-like growths on the twigs and branchlets, smooth, scaly, or plated astringent bark, and alternate pointed winter buds covered by numerous overlapping scales. They have simple deciduous leaves which are mostly oval or lance-shaped in outline and sharp-toothed on the margins. The terminal bud is present in the cherries but not in the plums.

The flowers are perfectly bisexual. They appear in the spring or early summer, with or shortly after the leaves, and in such dense masses that the trees seem to be covered with bloom. As a rule the flowers are white, occasionally pink or red, and they are borne solitary or in loose clusters. The fruit is a berry-like drupe and contains a single hard seed. It matures in the autumn of the first season, and although it is often very bitter is juicy and edible. The fruit of the native plums has a more or less marked groove on one side, and is often covered with a whitish bloom. The fruit of the cherries is much smaller and is without this bloom. The cherry seed is round, whereas that of the plum tends to be elongated, compressed, and ovoid. The seeds in each case contain small quantities of prussic acid.

Many exotic species such as the blackthorn or sloe, *Prunus spinosa* L., the bullace or damson, *Prunus insititia* L., the common garden plum, *Prunus domestica* L., the peach, *Prunus persica* (L.) Batsch, the mazzard or sweet cherry, *Prunus avium* L., the sour cherry, *Prunus cerasus* L., and the mahaleb cherry, *Prunus mahaleb* L., are extensively grown in Canada for their fruits and have been reported as escapes from cultivation in various parts of one or more of the eastern provinces. They may be expected to occur in increasing numbers wherever the parent trees are cultivated.



EASTERN CHOKE CHERRY FLOWERS

BLACK CHERRY

Prunus serotina Ehrh.

Wild black cherry, rum cherry.

The black cherry is the largest member of its genus occurring in Canada. It is usually a moderate-sized tree 60 to 70 feet in height and 1½ to 2 feet in diameter, but occasionally on very good sites grows in dense stands 100 feet high with a long straight trunk clear of branches for ½ or more of its length. The crown of a forest-grown tree is narrow and irregular. Grown in the open the trunk is much shorter, and the slender, mostly horizontal branches form a spreading oval crown.

Black cherry is found from western Nova Scotia and southern New Brunswick to Lake Superior. It has also been reported from the vicinity of Port Arthur. It will grow on a variety of sites, but does best on deep, rich, moist soils along streams and on bottom-lands in association with white ash, yellow birch, hickory, basswood, and tulip-tree.



LEAVES—Alternate, simple, elliptical to slightly lance-shaped, sharp-pointed, fine-toothed with sharp incurved teeth, 2 to 6 inches long; dark green, shiny above, paler below.

FLOWERS—April-June, shortly after the leaves; bisexual, white, about ¼ of an inch in diameter, clustered along a central stalk.

FRUIT—August-September; dark red to nearly black, rounded, ¼ to 3/8 of an inch in diameter; juicy, edible, slightly bitter; borne in elongated clusters.

TWIGS—Slender, reddish-brown, bitter to the taste, often covered by a greyish skin. Terminal bud about 1/8 to 1/6 of an inch long, pointed, light chestnut-brown, larger than the lateral buds.

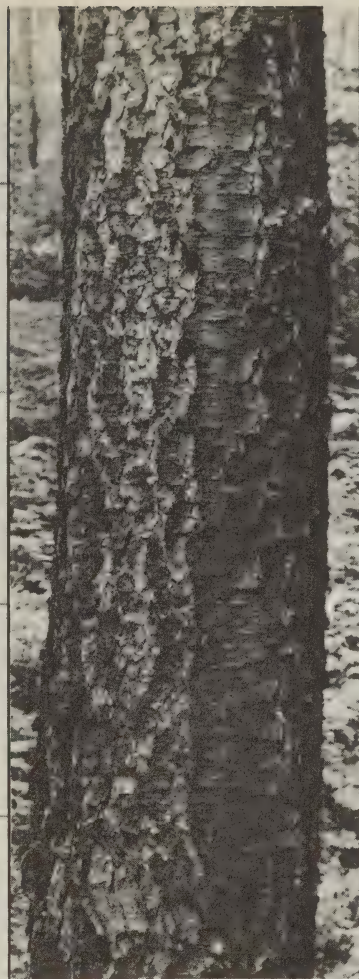
BARK—On young stems, smooth, red-brown, marked by conspicuous, whitish, horizontal lenticels; becoming on older trunks dark reddish-brown to nearly black, breaking into small brittle scales with upturned edges.

WOOD—Moderately heavy and hard, strong, fine-textured, semi-ring-porous; light to dark reddish-brown with paler sapwood.

The wood has a fine even texture without much figure or grain, a rich reddish-brown colour, and takes a good polish. It is not abundant anywhere but when available is used for furniture, cabinet-work, and decorative finish. Many of the pieces of furniture produced by colonial craftsmen in early days are fine examples of its value for cabinet-work.



LEAF



MATURE SCALY BARK



LEAF



WINTER TWIG (ABOVE)

FRUIT (BELOW)

PIN CHERRY

Prunus pensylvanica L.f.

Fire cherry, red cherry, bird cherry, pigeon cherry, wild red cherry.

The pin cherry is commonly a small tree 10 to 25 feet high and 4 to 8 inches in diameter, but sometimes under favourable conditions attains a height of 50 feet and diameters of 12 inches or more. The trunk is slender and erect, and usually extends to the top of the tree. The crown of very slender horizontally spreading branches is narrow and round-topped.

This tree occurs from the Atlantic Coast westward across Canada to the Rocky Mountains in British Columbia, and northward well into the boreal forest. It is often found in new clearings, along roadsides, and on burned-over areas on a wide variety of sites from dry sandy soils to wet loams. It is very intolerant of shade and for this reason is rare in the dense forest.

A variety of the pin cherry, var. *saximontana* Rehd., has been reported with the species in the Rocky Mountain region. It is a shrubby form with shorter, coarser-toothed leaves, fewer flowers, and larger fruit.



LEAVES—Alternate, simple, lance-shaped, sharp-pointed, fine-toothed, $2\frac{1}{2}$ to $4\frac{1}{2}$ inches long; bright shiny green above, paler below.

FLOWERS—May-June, after the leaves, bisexual; white, about $\frac{1}{2}$ -inch in diameter, borne in 4- to 5-flowered clusters.

FRUIT—August-September; round, $\frac{1}{4}$ to $\frac{1}{3}$ of an inch in diameter, light red with sour edible flesh.

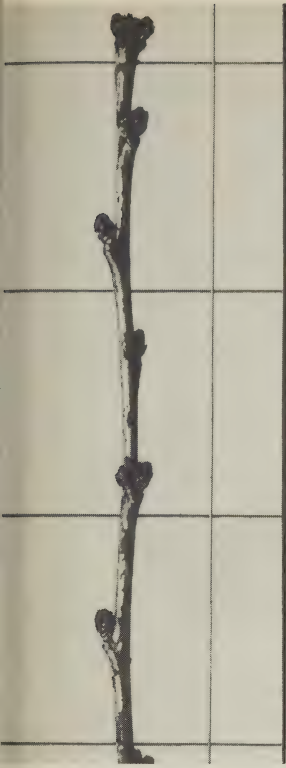
TWIGS—Slender, smooth, shiny, bright red, often coated with a greyish skin. Terminal bud minute, about $\frac{1}{12}$ of an inch long, rounded, bright red-brown; lateral buds similar.

BARK—Thin, smooth, reddish-brown, marked by conspicuous, raised, horizontally elongated, orange-coloured lenticels.

WOOD—Light, soft, not strong, diffuse-porous; light brown with paler sapwood.

The wood is sometimes used locally for fuel-wood. The tree is quite useful, however, in preventing erosion on newly cleared forest land and in providing a light shade for the seedlings of more tolerant species.

PIN CHERRY



WINTER TWIG



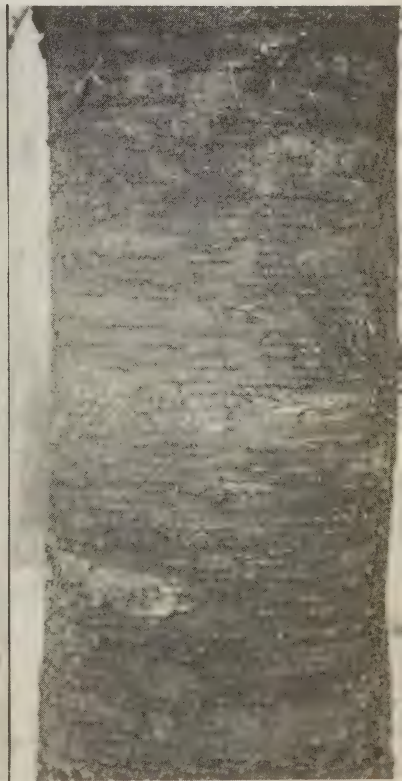
LEAVES



FRUIT



FLOWERS



BARK

CHOKE CHERRY

Prunus virginiana L.

Wild cherry, red-fruited choke cherry, red choke cherry.

The choke cherry and its varieties, the black choke cherry, var. *melanocarpa* (A. Nels.) Sarg., and the western choke cherry, var. *demissa* (Nutt.) Torr., are shrubs or small trees — more often shrubs — commonly 10 to 25 feet in height and 4 to 6 inches in diameter. The trunks are slender, often crooked and inclined, with narrow irregular crowns of slender erect or horizontally spreading branches. The roots usually go quite deep.

The choke cherry is found from Newfoundland and eastern Quebec to Saskatchewan; in Central Canada its range merges with that of the black choke cherry, the common choke cherry from Saskatchewan to British Columbia. The western choke cherry is probably found only in southern British Columbia. All three are relatively intolerant of shade and prefer rich, usually moist, soils in open situations. They occur scattered or in small thickets along streams, fences, highways, the borders of the forest and in small clearings. All three choke cherry varieties produce root suckers freely.

The black choke cherry is distinguished from the eastern variety by its relatively thick leaves and darker, somewhat less astringent fruit. The western choke cherry is distinguished chiefly by its usually heart-shaped leaves which are covered below with pale down.



LEAVES—Alternate, simple, usually widest above the middle, abruptly pointed, rounded or slightly heart-shaped (var. *demissa* usually heart-shaped) at the base, fine-toothed, thin (var. *melanocarpa* relatively thick), 2 to 4 inches long; dark green above, paler and smooth (var. *demissa* downy) except for tufts of hair along the veins below.

FLOWERS—May-June, after the leaves; bisexual, white, 1/3 to 1/2-inch in diameter, clustered along a central stalk.

FRUIT—August-September; rounded, 1/4 to 1/2-inch in diameter, red to dark red (var. *melanocarpa* nearly black or rarely yellow), with juicy, edible, astringent flesh.

TWIGS—Slender to moderately stout, brown to greyish-brown, smooth (var. *demissa* downy at first). Terminal bud sharp-pointed, 1/8 to 1/4 of an inch long, chestnut-brown, similar to the laterals.

BARK—Thin, smooth, greyish or reddish-brown, slightly furrowed and scaly on very old trunks.

WOOD—Heavy, hard, weak, fine-textured, diffuse-porous; light brown with paler sapwood.

The small size of the choke cherries deprives their wood of any commercial importance. The fruits are eaten by birds, and are sometimes gathered and used in preserves and jellies.

CHOKE CHERRY

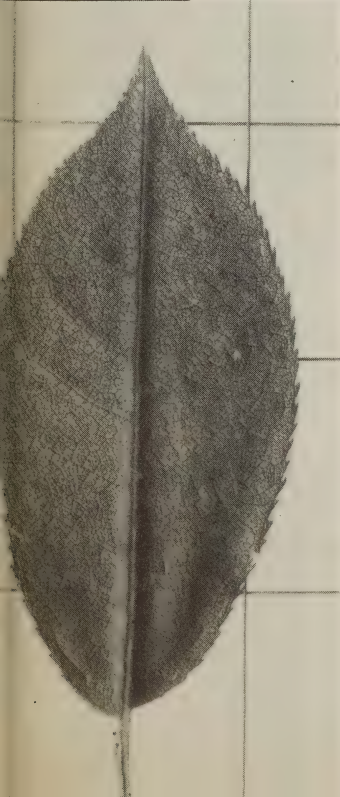
WINTER TWIG



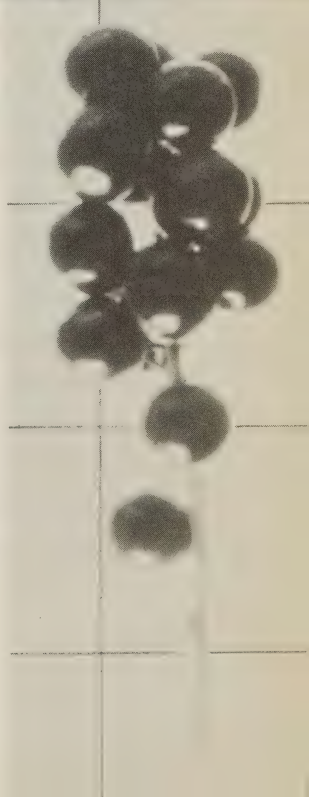
CHOKE CHERRY
LEAF



WESTERN
CHOKE CHERRY
LEAF



FRUIT



BITTER CHERRY

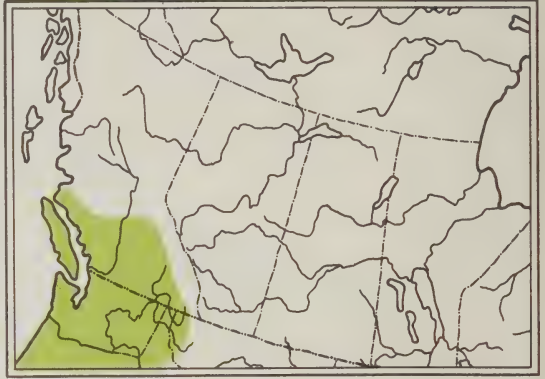
Prunus emarginata (Dougl.) D. Dietr.

Wild cherry, wild plum.

On poor, exposed situations the bitter cherry is frequently a low, much-branched, bushy shrub. On better sites under favourable conditions it not infrequently reaches heights of 40 or 50 feet and diameters of 12 inches or more. The larger trees usually develop a straight clear trunk and a short symmetrical crown of slender, mostly ascending branches.

Bitter cherry is found throughout southern British Columbia; usually on moist soils near streams and on low hillsides, less often on high, dry, mountainous slopes. It forms pure stands at the higher elevations; lower down it occurs in pure stands or with Douglas fir and western flowering dogwood. It is often abundant on burns and newly cut-over areas. The most suitable site is a moist, sandy, or gravelly soil.

This species is sometimes confused with the pin cherry. It can be distinguished from the latter by its fine-toothed leaves, which are rounded or blunt-pointed at the tip, and by its fruit, which is clustered on a short, central stalk.



LEAVES—Alternate, simple, oval in outline, rounded or blunt-pointed, fine-toothed, 1 to 3 inches long; dark green above, paler, more or less hairy below.

FLOWERS—May-June; bisexual; dull white, $\frac{1}{3}$ to $\frac{1}{2}$ -inch in diameter, borne in small clusters.

FRUIT—July to September; rounded, berry-like, dark red to nearly black $\frac{1}{4}$ to $\frac{1}{2}$ -inch in diameter, with thin, very bitter flesh.

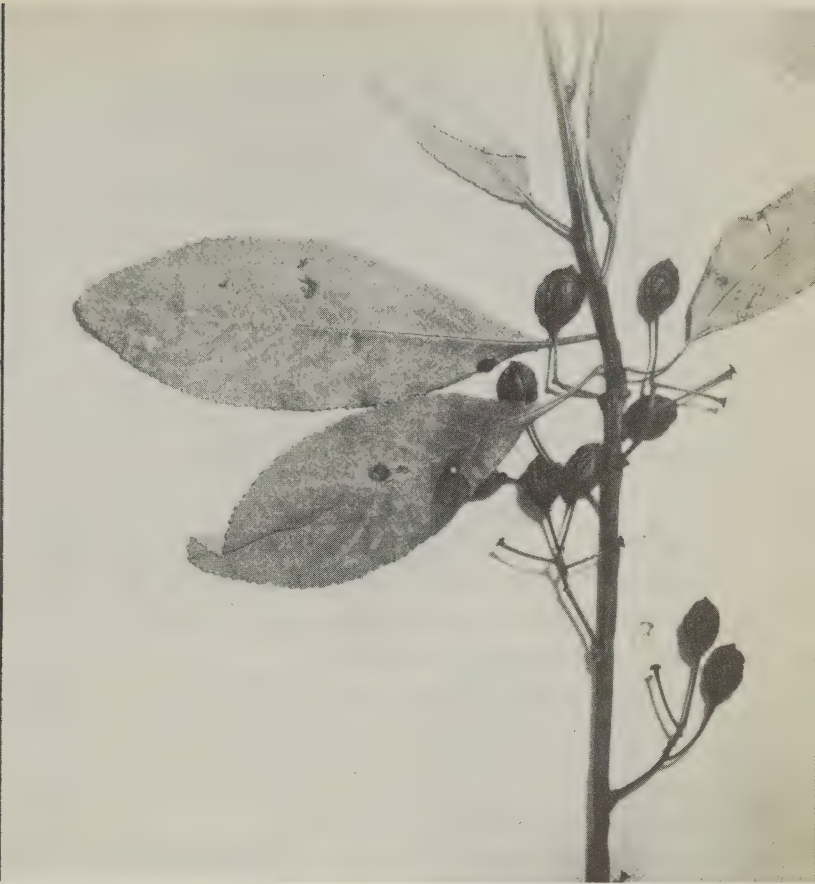
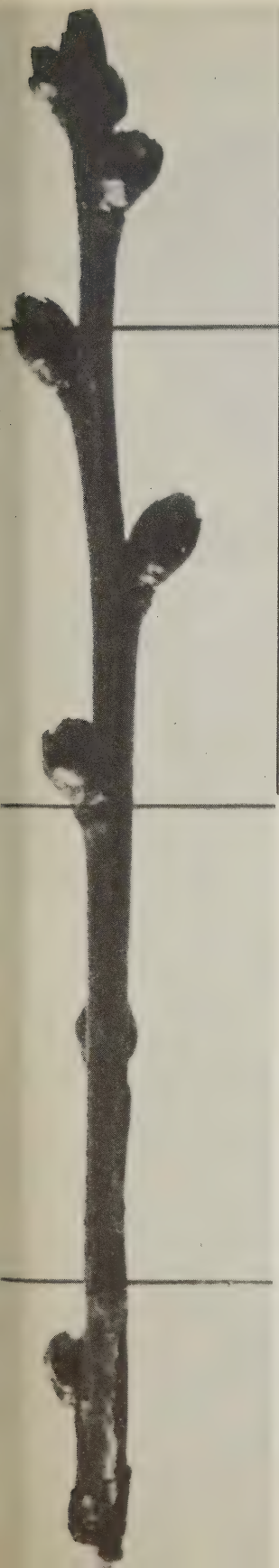
TWIGS—Slender, flexible, at first green and downy; becoming smooth, reddish-brown. Terminal bud sharp-pointed, chestnut-brown, about $\frac{1}{8}$ of an inch long, similar to the lateral buds.

BARK—Thin, smooth, dark brown to grey, very bitter to the taste.

WOOD—Light, soft, brittle, diffuse-porous; dull brown with paler sapwood.

The bitter cherry has no economic importance. The fruit is eaten by birds and the tree may have some value in controlling erosion.

BITTER CHERRY



LEAVES AND FRUIT, ACTUAL SIZE

WINTER TWIG

CANADA PLUM

Prunus nigra Ait.

Red plum, wild plum, horse plum.

The Canada plum is a large shrub or small bushy tree, rarely more than 20 to 25 feet in height and 5 to 6 inches in diameter. The trunk is short and slender, and commonly divides a few feet above the ground into several stout, mostly ascending main branches. The crown is narrow, and is composed of many stout, stiff, more or less twisted and erect branches ending in stout twigs which, in their second year, develop spine-like lateral spurs. These coarse spurs, which may put out leaves, distinguish this tree from any of the cherries.

The Canada plum is distributed from the valley of the St. John River in New Brunswick westward throughout southern Quebec and southern Ontario, in the region of Lake Superior west of Port Arthur in western Ontario, and north to the Riding Mountain in Manitoba. It is also reported at the fords of several rivers in southern Alberta and from the Annapolis Valley and west of Digby in Nova Scotia. It prefers moist sites on limestone soils, in small clearings along fences and in old pastures.



LEAVES—Alternate, simple, oval to nearly circular in outline, abruptly sharp-pointed, coarse-toothed with slightly rounded teeth, 3 to 5 inches long; dark green, smooth above, paler, more or less hairy with tufts of pale hair in the angles of the veins below.

FLOWERS—May-June, before or with the leaves, bisexual; white, turning pink, about $1\frac{1}{4}$ inches in diameter, borne in 3- or 4-flowered clusters.

FRUIT—August; rounded, 1 to $1\frac{1}{4}$ inches long, orange-red, with sour, edible flesh.

TWIGS—Stout, smooth or slightly downy, bright green, turning brown the second season. No terminal bud; lateral buds $\frac{1}{8}$ to $\frac{1}{4}$ of an inch long, sharp-pointed, chestnut-brown.

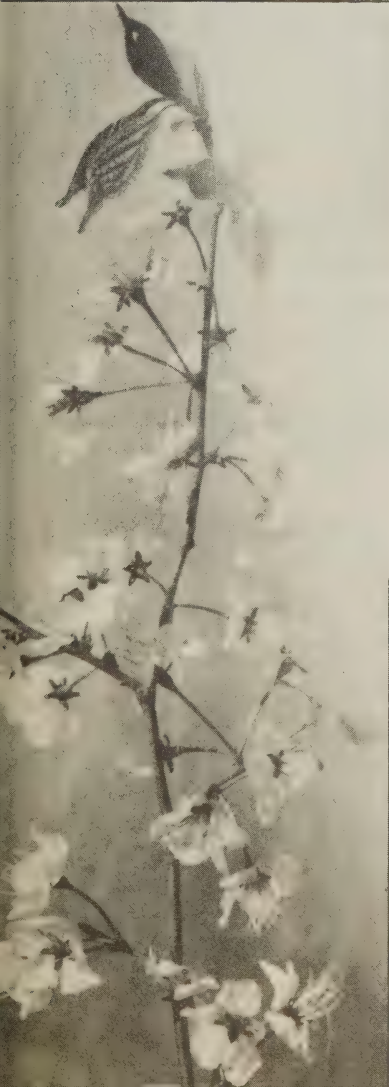
BARK—At first smooth, grey-brown; later splitting into thick, curly scales.

WOOD—Heavy, hard, fine-textured, diffuse-porous; rich red-brown with paler sapwood.

The wood is of no commercial importance. The tree is occasionally planted for its showy flowers, and several cultivated plums have been developed from it.

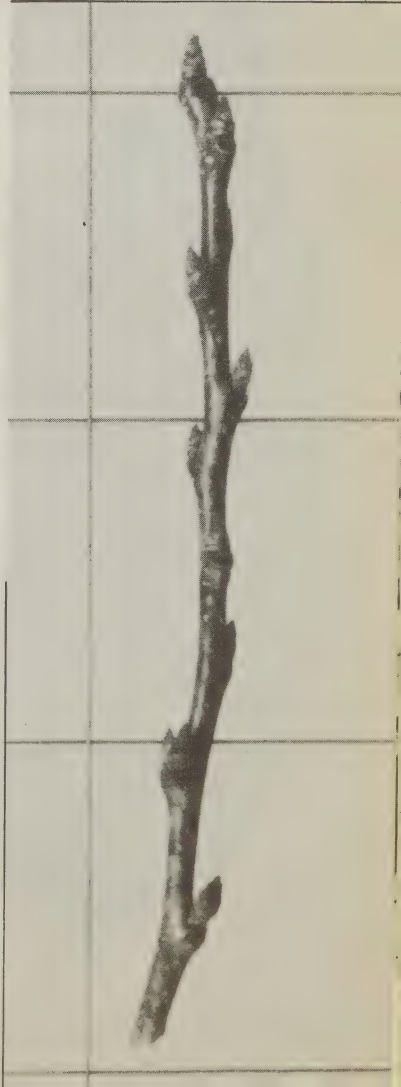


LEAF



◀ FLOWERS

WINTER TWIG ▶



FRUIT



WILD PLUM

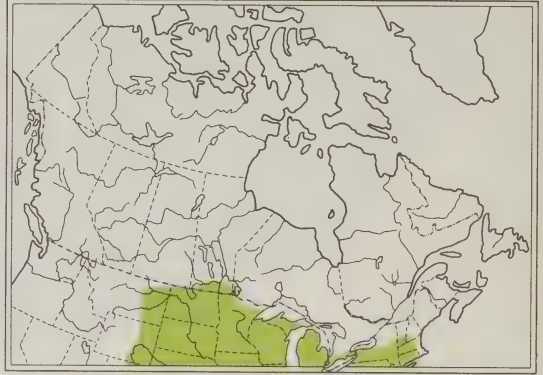
Prunus americana Marsh.

Red plum, American plum, yellow plum.

The wild plum is a large shrub or occasionally a small tree 20 to 30 feet in height, with a trunk rarely more than 1 foot in diameter and dividing usually about 4 or 5 feet above the ground into several wide-spreading limbs. It forms a broad, graceful crown composed of many slender, spreading branches often pendulous at the ends. The small branches are frequently furnished with many, long, spur-like branchlets. The roots are moderately deep and wide-spreading.

In Canada the wild plum is usually found along streams and the borders of swamps in southern Ontario and southern Manitoba. It has also been reported from southern Quebec, possibly as an escape from cultivation. It prefers rich, moist soil, where it frequently spreads by means of root suckers into broad thickets.

The wild plum is easily distinguished from the Canada plum by its narrower leaves, furnished on the margins with sharp-pointed teeth.



LEAVES—Alternate, simple, oval to slightly oblong in outline, sharp-pointed, rounded to wedge-shaped at the base, sharp-toothed, 2 to 4 inches long; dark green, more or less rough above, paler, smooth or slightly hairy along the mid-vein below.

FLOWERS—May-June, before or with the leaves, bisexual, white, ill-smelling, about 1 inch in diameter, borne in 2- to 5-flowered clusters.

FRUIT—August-October; round or slightly elongated, about 1 inch long, red or rarely yellowish, with sour but edible flesh.

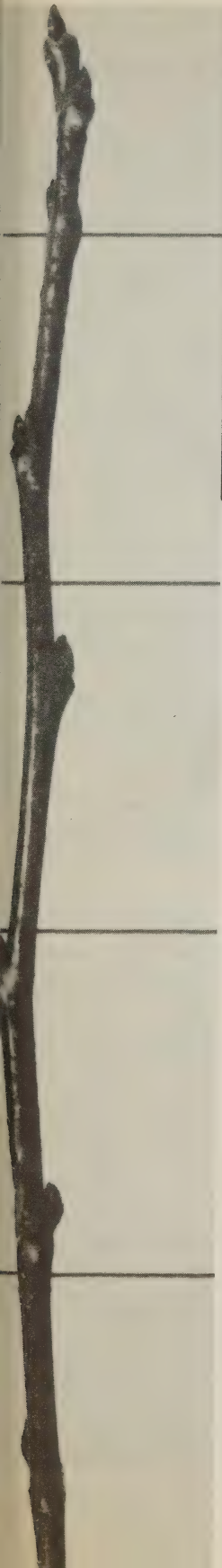
TWIGS—Slender, smooth, orange-brown. No terminal bud; lateral buds $\frac{1}{8}$ to $\frac{1}{4}$ of an inch long, sharp-pointed, chestnut-brown.

BARK—Reddish-brown, the outer layers separating into long, thin scales on older trunks.

WOOD—Heavy, hard, fine-textured, diffuse-porous; dark brown with paler sapwood.

The wood is of no economic value. The fruit is sometimes made into preserves, and the tree is occasionally planted for decorative purposes.

WILD PLUM



FRUIT

WINTER
TWIG



LEAF



REDBUD

Cercis canadensis L.

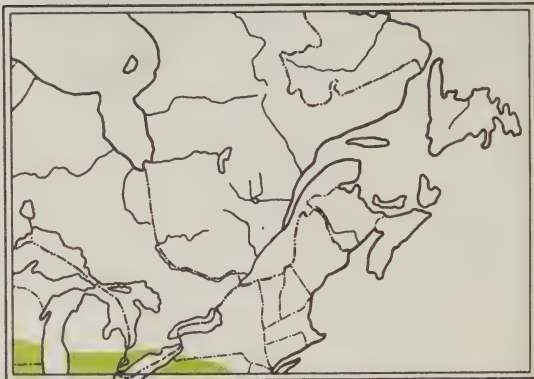
Judas-tree.

The redbud is a small tree, usually not more than 20 to 25 feet in height and 8 or 10 inches in diameter. The trunk is straight, slender, and erect, and often divides a short distance above the ground into a number of stout branches, which may be either erect or spreading. The crown is narrow and upright in the forest, flat-topped and spreading in the open.

This is a very rare species in Canada. An occasional tree may be found in southwestern Ontario in the counties bordering on Lake St. Clair and Lake Erie. It prefers moist sites along the banks of streams and ravines, and on rich bottom-lands. It is sometimes found on abandoned farmlands, cut-over woodlands, and as an understory tree in the forest.

The redbud is readily recognized by its showy magenta flowers and simple entire heart-shaped leaves.

Of the 7 species of redbud, *Cercis* L., 2 occur on this continent. Only 1 of these occurs in Canada. None of the species are of importance except for decorative planting.



LEAVES—Alternate, simple, heart-shaped, $2\frac{1}{2}$ to 5 inches long, short-pointed, entire, smooth; bright green above, paler and smooth or slightly downy below.

FLOWERS—April, before the leaves; bisexual; pink or rose-colored, pea-like; in clusters from separate flower buds.

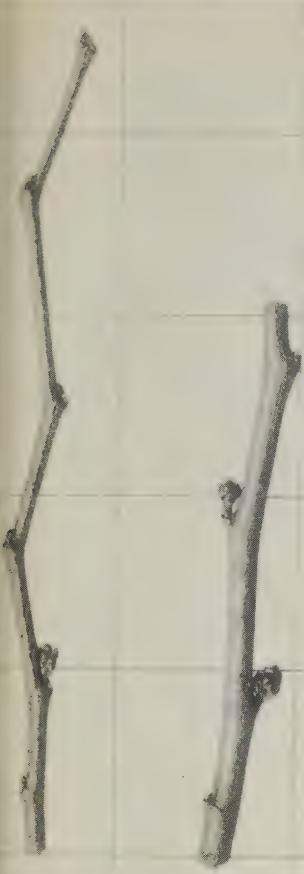
FRUIT—Midsummer; a thin, flat, pinkish-brown pod, $2\frac{1}{2}$ to $3\frac{1}{2}$ inches long, containing the small flattened seeds; opening and releasing seed late in the autumn or early in the winter.

TWIGS—Slender, smooth, light brown. No terminal bud; leaf buds minute, blunt-pointed, dark red, pressed closely against the twig; flower buds larger, sometimes located at the base of the twigs.

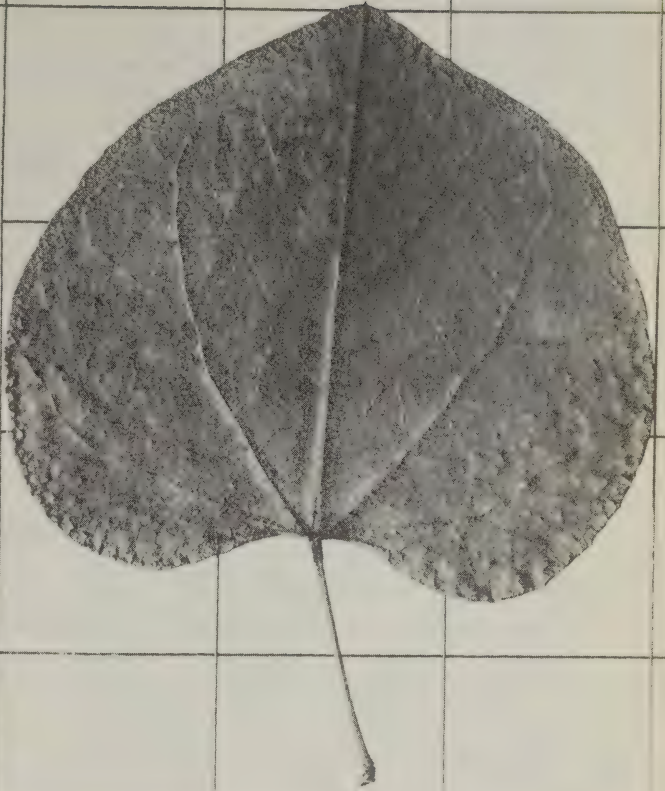
BARK—Reddish-brown, scaly, occasionally fissured into long narrow ridges.

WOOD—Heavy, hard, weak, close-grained, ring-porous; dark brown with paler sapwood.

The redbud has no value as a timber tree. It is highly ornamental however, and where a small tree is desired for decorative purposes, this is probably the best of the native species.



WINTER TWIGS



HEART-SHAPED LEAF



FRUIT (POD)



MATURE SCALY BARK

HONEY-LOCUST

Gleditsia triacanthos L.

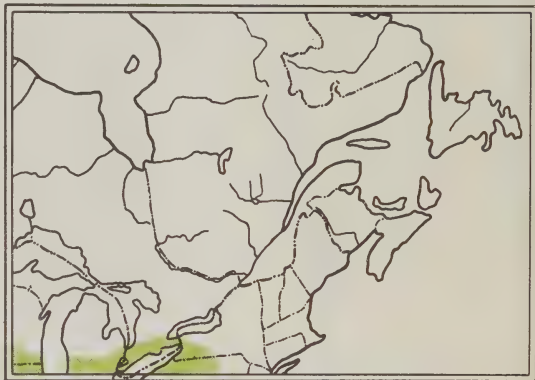
Three-thorned acacia, thorny locust, sweet locust.

There is some doubt as to whether the honey-locust is a native species in Canada, but, since it has been established here for a long time and is now a fairly common tree in southern Ontario, it has been included in this bulletin. It is a small- to medium-sized tree in the northern forest, but farther south under more favourable conditions it frequently attains a height of 70 to 100 feet or higher, and diameters of 2 to 3 feet or more. The trunk is short and stout, often divided near the ground, and usually well armed with sharp forked thorns. The open flat-topped crown is composed of slender, spreading, often drooping branches.

This tree prefers rich moist soils around meadows and lakes and along streams. It will, however, thrive on drier sites. It never forms pure stands, but grows singly or scattered in small groups.

. . .

The honey-locusts, *Gleditsia* L., include about 12 species of which 2 occur in North America. Only 1 is found in Canada.



LEAVES—Alternate, compound and double-compound, 6 to 10 inches long, composed of 18 or more leaflets borne on a grooved, hairy stem. Leaflets oval in outline, rounded or blunt-pointed, sparsely toothed, up to 1½ inches long; dark green and shiny above, paler below.

FLOWERS—June, after the leaves; unisexual and bisexual, both on the same tree; in loose and greenish-white clusters.

FRUIT—Autumn; a flattened, frequently twisted, dark brown, shiny pod, up to 18 inches long, falling closed during the autumn and early winter months.

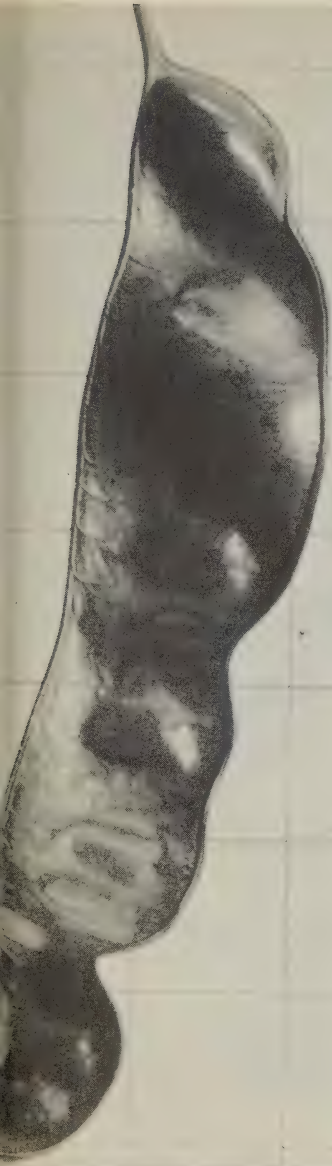
TWIGS—Moderately stout, zigzag, shiny, greenish to reddish-brown, armed with 1- to 3-branched thorns. No terminal bud; lateral buds minute, in clusters of 3 to 4.

BARK—Smooth, greyish-brown at first, becoming brown to almost black, deep-furrowed into long, scaly ridges.

WOOD—Heavy and hard, strong, ring-porous; red to reddish-brown with yellowish sapwood.

The honey-locust is not abundant and consequently the supply of it is limited. It is desirable for its durability in conditions favourable to decay, has an attractive figure, and possesses several other qualities which make it suitable for posts, railway ties, furniture, and general construction. The tree is frequently planted for hedges and decorative purposes.

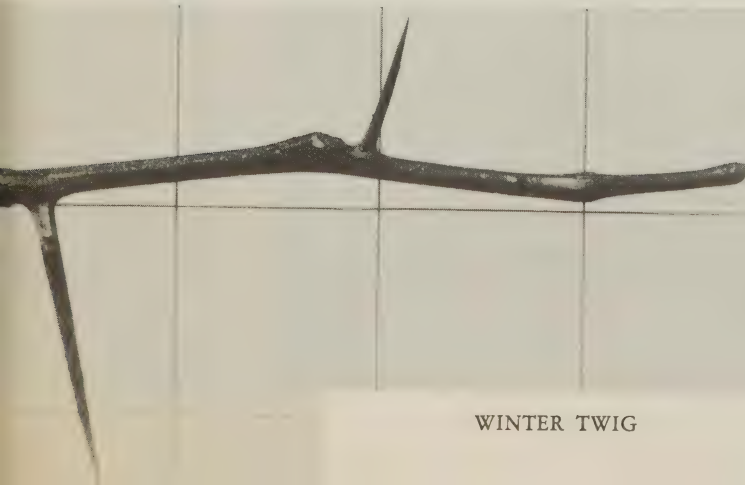
HONEY-LOCUST



FRUIT POD



DOUBLE-COMPOUND LEAF



WINTER TWIG



SEED

THE COFFEE-TREES

KENTUCKY COFFEE-TREE

Gymnocladus dioica
(L.) K. Koch

Coffee-tree, coffee bean.

The Kentucky coffee-tree is a medium-sized species sometimes attaining a height of 80 feet and a diameter of 2 feet, but it is ordinarily a smaller tree which divides comparatively near the ground into 3 or 4 upright limbs. The narrow crown is formed of stout stiff branchlets.



In Canada it is found only in southern Ontario, usually as scattered trees in rich woods, but is nowhere common.

The coffee-tree is easily recognized by its very large, double-compound leaves, large flat seed pods which generally persist on the tree until well into the winter, stout blunt twigs with reddish pith, and large upright limbs.

LEAVES—Alternate, double-compound, 12 to 36 inches long, consisting of 40 or more leaflets borne on a stout branched stem. Leaflets oval in outline, sharp-pointed, toothless, 2 to 2½ inches long; shiny, dark green above, paler below.

FLOWERS—June, after the leaves; unisexual and bisexual; greenish purple, in long branched clusters; both kinds on the same tree.

FRUIT—Autumn; a broad, flattened, purplish-brown pod, 4 to 10 inches long, containing several hard, round, flat, reddish-brown seeds; usually remaining unopened on the tree over winter.

TWIGS—Very stout, smooth or downy, dark brown, with large conspicuous leaf scars and reddish pith. No terminal bud; lateral buds minute, partially sunken into the bark.

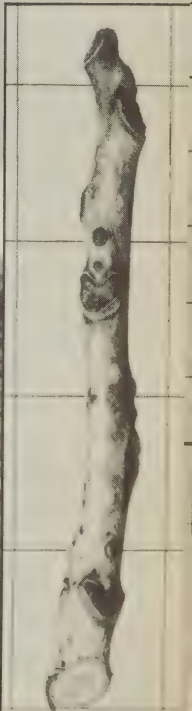
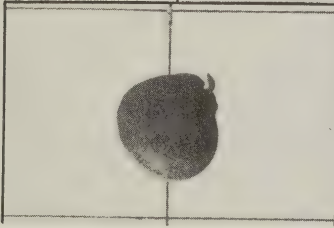
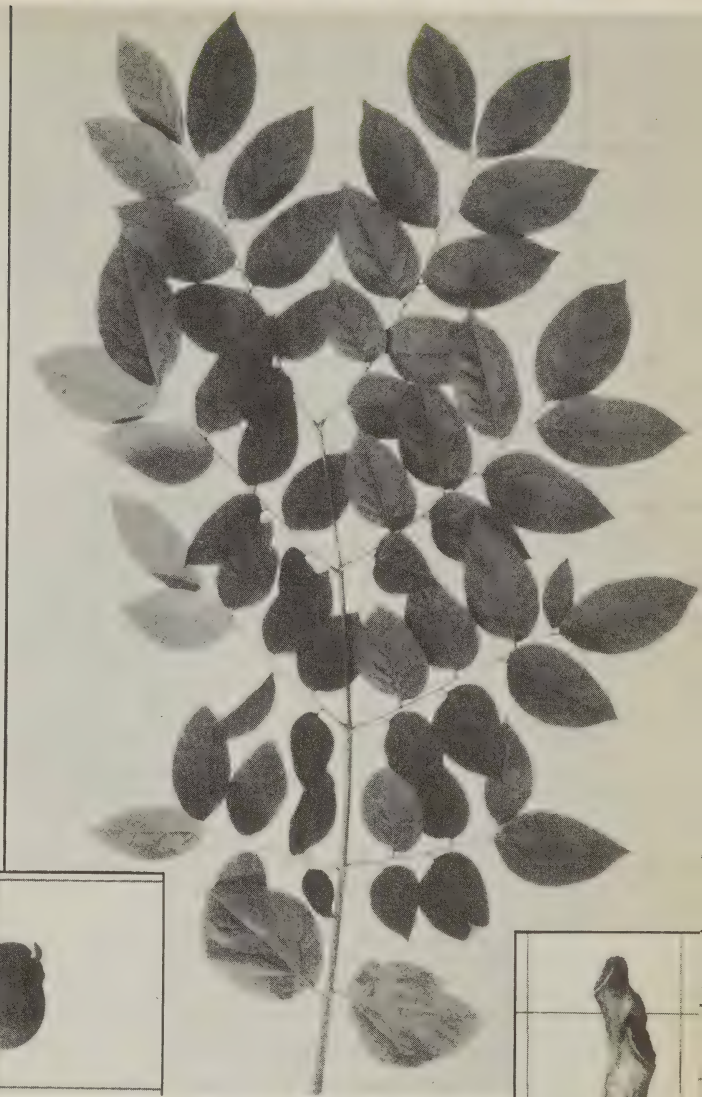
BARK—Dark grey or brown, rough, broken into hard, scaly ridges.

WOOD—Moderately heavy and hard, straight-grained, ring-porous; light red to reddish-brown with yellowish-white sapwood.

There are only 2 known species of coffee-tree, *Gymnocladus* Lam., one native to this continent, and the other to Central China.

This tree is too rare in Canada to be of any commercial importance. The wood is noted for its durability and can be used for poles and posts, railway ties, furniture, and interior finish. It is frequently confused with that of the honeylocust. The species is quite hardy outside its natural range and has been planted successfully as far north as the City of Ottawa.

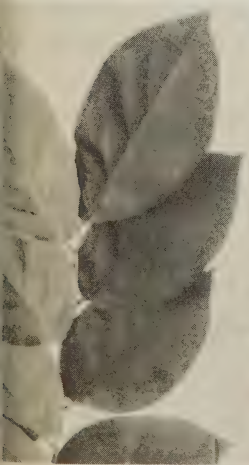
KENTUCKY COFFEE-TREE



FRUIT (POD)

SEED

DOUBLE-COMPOUND LEAF



WINTER TWIG

LEAFLETS

MATURE BARK

THE HOP-TREES

HOP-TREE

Ptelea trifoliata L.

Wafer-ash.

The hop-tree or wafer-ash is a shrub or small tree rarely more than 20 to 25 feet in height and 6 to 8 inches in diameter. The trunk is slender, and supports a round-topped crown of small spreading branches. The fruit is similar in appearance to that of the native elms, but it has a slightly larger wing, is never hairy, and contains 2 seed chambers (rarely 3) instead of 1. The leaves, fruit, and bark are extremely bitter to the taste.

This species is probably native only along western Lake Erie in southern Ontario. It has been found in the Niagara District of Ontario and at Pointe-du-Lac on Lake St. Peter in Quebec but may have spread from cultivated trees nearby.

The hop-tree is commonly found on dry rocky slopes and along the borders of the forest. It occurs singly or in small groups, quite often in the shade of other trees.

The genus, *Ptelea* L., is found only in North America. Seven or more variable species are known, but only 1 of these, *Ptelea trifoliata* L., regularly reaches tree size. It is the only member of the genus occurring in Canada.



LEAVES—Alternate, or rarely almost opposite, consisting of 3 (occasionally 5) leaflets, oval in outline, sharp-pointed, 4 to 6 inches long, entire or fine-toothed; shiny, dark green above, paler below.

FLOWERS—June, after the leaves; unisexual and bisexual; greenish-white, clustered; both types borne on the same tree.

FRUIT—Late autumn; a 2-celled (rarely 3), nearly circular, flattened, long-stalked, greenish samara $\frac{3}{4}$ to 1 inch in diameter, the thin wing completely encircling the seed-chamber; often remaining on the tree over winter. Each cell containing one seed.

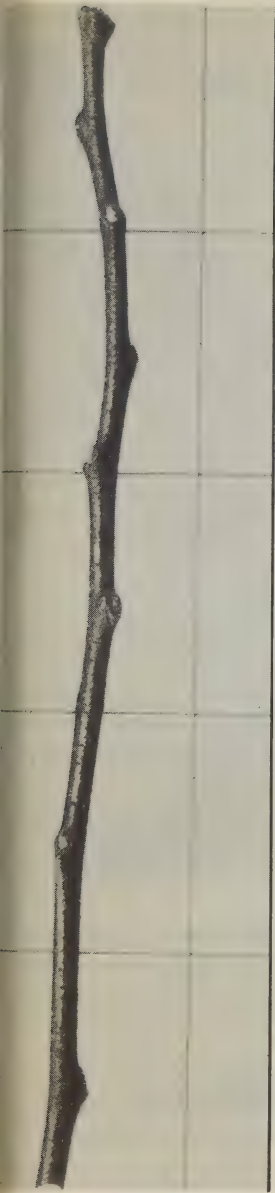
TWIGS—Slender, hairy at first, becoming shiny; dark red-brown and marked by wart-like protuberances. No terminal bud; lateral buds small, rounded, depressed, yellowish, hairy.

BARK—Dark grey or reddish-brown, smooth, except for the wart-like protuberances.

WOOD—Heavy, hard, close-grained, ring-porous; yellowish-brown.

The wood of the hop-tree is of no commercial importance. The fruit is often used locally as a substitute for hops in brewing beer. The tree is widely used in ornamental planting.

HOP-TREE



WINTER TWIG



LEAF



FRUIT (SAMARAS)

STAGHORN SUMAC

Rhus typhina L.

Sumac.

The staghorn sumac is a small tree or upright shrub. Ordinarily it is 10 to 15 feet in height, but may occasionally reach a height of 30 feet. The trunk is short, more or less crooked, and inclined. The branches are irregular in form and divide into a comparatively small number of stout curved twigs which suggest the horns of a stag, hence the common name. When in leaf the tree has a rather flat, spreading top. The drooping fern-like foliage, which turns to a beautiful scarlet in the autumn, and the large clusters of persistent bright red "berries" are other distinguishing features.

The staghorn sumac is found from Nova Scotia and the lower St. Lawrence River Valley to Georgian Bay and Lake Huron.

It is very intolerant of shade and is usually confined to dry rocky or sandy soils, along fences and roadsides, in old pastures, and on abandoned worn-out farmland. It is rarely found in mixtures with other tree species.

. . .

The staghorn is the only species of *Rhus* L. to reach tree size in Canada. Seven other species occur in various parts of the country, but only as shrubs. None are important. One of the best known members of the genus is the poison ivy, *Rhus radicans* L.



LEAVES—Alternate, compound, 16 to 24 inches long, composed of 11 to 31 leaflets borne in pairs on a stout, hairy stem. Leaflets lance-shaped, sharp-pointed, sparse-toothed, 2 to 5 inches long; dull dark green above, paler below.

FLOWERS—June-July, after the leaves; unisexual, in dense yellowish-green clusters; the male and female on separate trees.

FRUIT—Autumn; rounded, thin-fleshed, berry-like, about 1/8 of an inch in diameter, densely coated with bright red hair; borne in large, cone-shaped clusters; persisting on the tree over winter.

TWIGS—Very stout, densely covered with brownish to almost black hair, and yielding a milky juice when broken. No terminal bud; lateral buds small, covered with brown hair.

BARK—Thin, dark brown, smooth on young stems; smooth or scaly on old trunks.

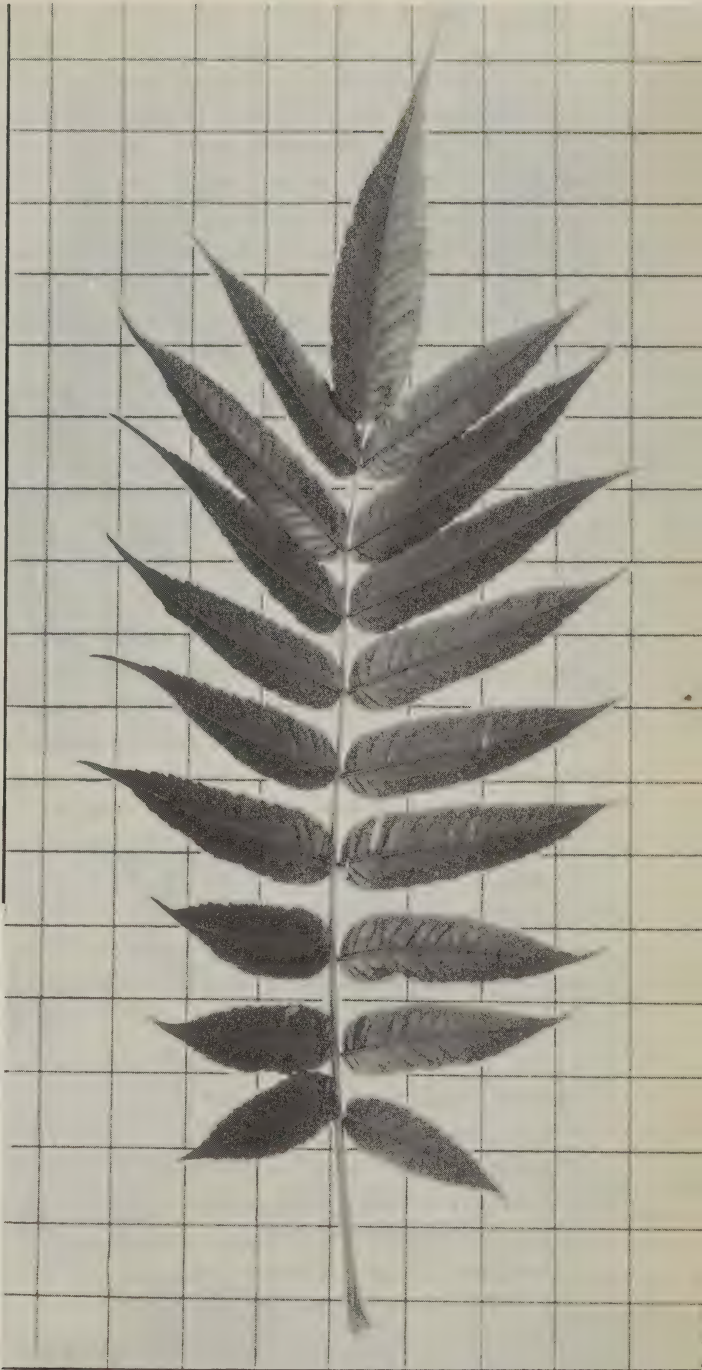
WOOD—Light, soft, brittle, coarse-grained, ring-porous; orange-coloured streaked with broad green rays.

This tree is sometimes sawn into lumber and used for decorative finishing and in making wooden novelties. It is occasionally planted as an ornamental tree for its showy autumn foliage.

STAGHORN SUMAC

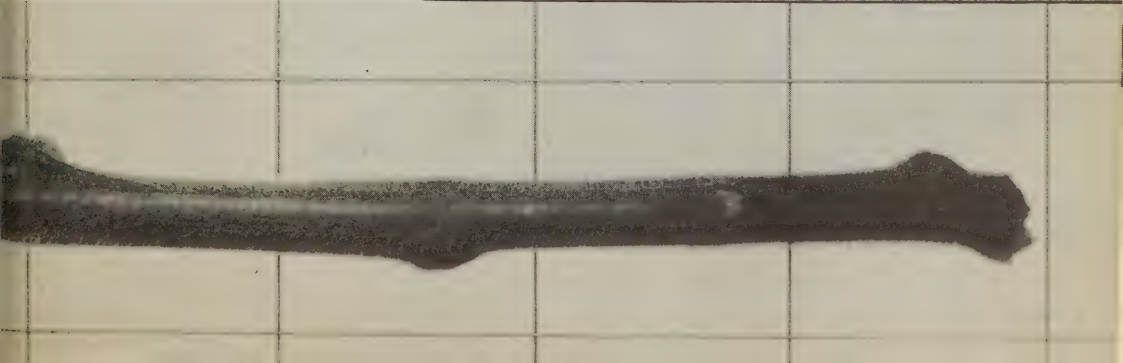


CONE-SHAPED FRUIT CLUSTER



COMPOUND LEAF

HAIRY WINTER TWIG



The MAPLES *Acer* L.

Approximately 115 species of maple occur throughout the northern hemisphere. They are most abundant in Eastern Asia, particularly in the Himalayan Mountains and in China. Ten are found in Canada, of which 2, the vine maple and the broadleaf maple, are confined to southwestern British Columbia. A third western species, the Douglas maple, ranges east as far as the mountains of western Alberta. The remaining 7 species, the mountain, striped, red, silver, sugar, black, and Manitoba maples occur in one or more of the Eastern Provinces. Many exotic species have been introduced for street and ornamental planting, the most common of which are the Norway maple, *Acer platanoides* L., and the sycamore maple, *Acer pseudoplatanus* L., both from Europe and Western Asia. The Amur maple, *Acer ginnala* Maxim., from China and Japan, and the Tatarian maple, *Acer tataricum* L., from Eastern Europe are sometimes used for decorative purposes, hedges, and windbreaks. Several of the native species are extensively used for ornamental planting and shelter-belts.

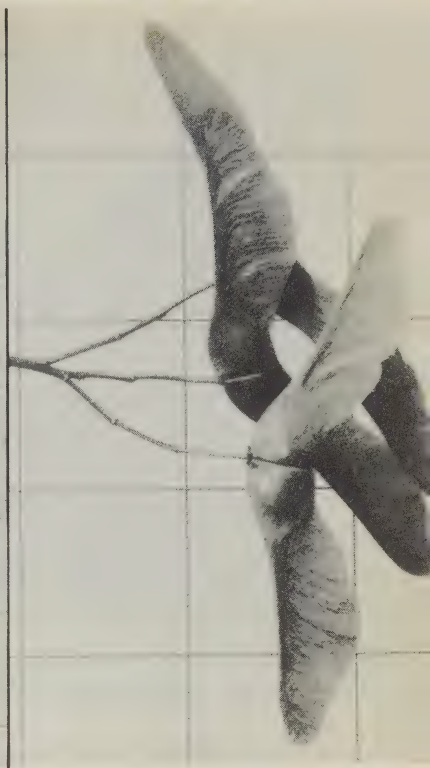
The maples are deciduous trees (occasionally shrubs) with opposite, simple or compound, variously lobed leaves, winter buds with few to many scales, and smooth or rough (often scaly) bark. All species have the terminal bud. The flowers may be unisexual, bi-sexual, or both, depending upon the species. Some trees bear only male flowers, some male and bisexual flowers, and others bear only female flowers. They appear before, with, or shortly after the leaves begin to unfold, on the growth of the past season. The fruit consists of a pair (rarely 3 or more) of samaras — terminally winged seeds — joined together at their seed cavities. It matures in the early summer on the red and silver maples and in the autumn on the other Canadian species. The individual samaras are sometimes called keys.

Maple is an important Canadian hardwood. It is in demand for flooring, furniture, vehicles, shoe lasts, boats, interior woodwork, plywood, veneer, handles, and for many other purposes. The sugar and black maples, the "hard" maple of the timber trade, possess the qualities of hardness, strength, and stiffness to a greater degree than any of the other maples and are, therefore, the most sought after. "Curly" and "Bird's-eye" maple, esteemed for furniture making and interior finish, are unusual forms occasionally met with.

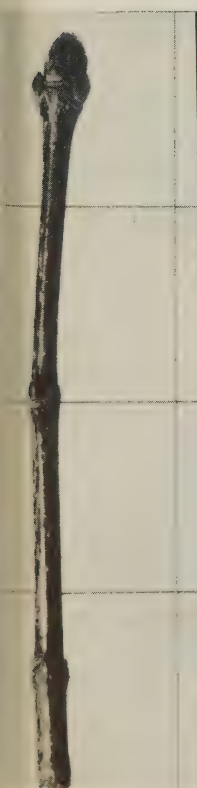
The sap of all the maples contains a form of sugar and in the conditions of scarcity that frequently occurred in pioneer days all species were tapped for the purpose of obtaining sugar. In commercial practice today, however, only the sugar and black maples are regularly tapped for sugar and syrup-making.



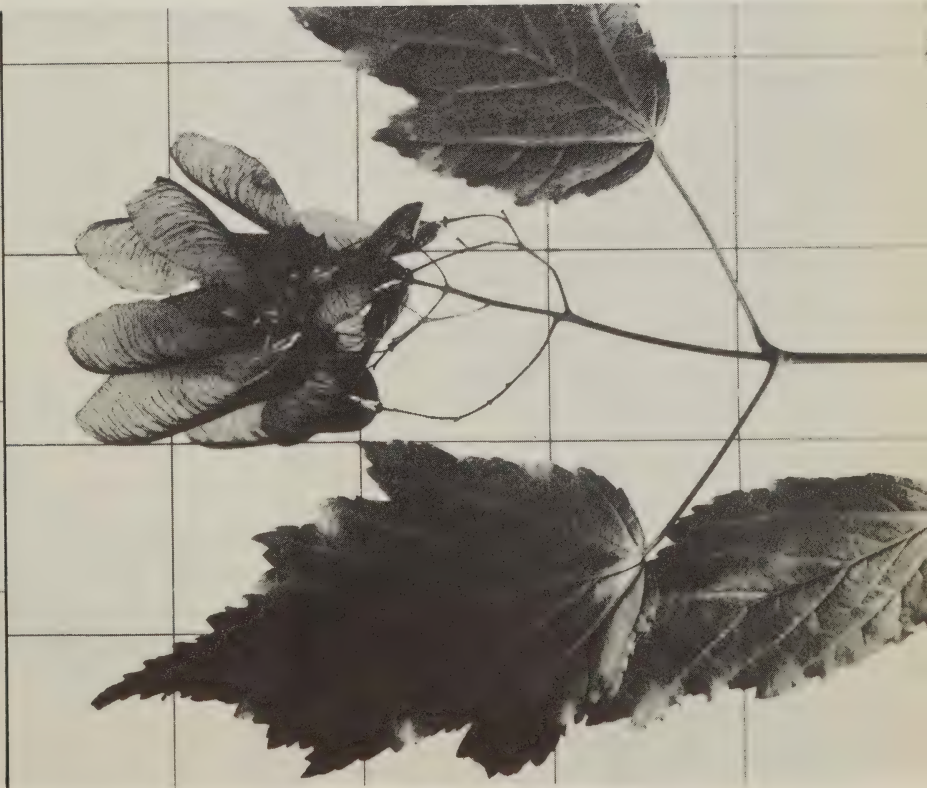
NORWAY MAPLE LEAF



NORWAY MAPLE FRUIT



NORWAY MAPLE
WINTER TWIG



AMUR MAPLE LEAVES AND FRUIT

MOUNTAIN MAPLE

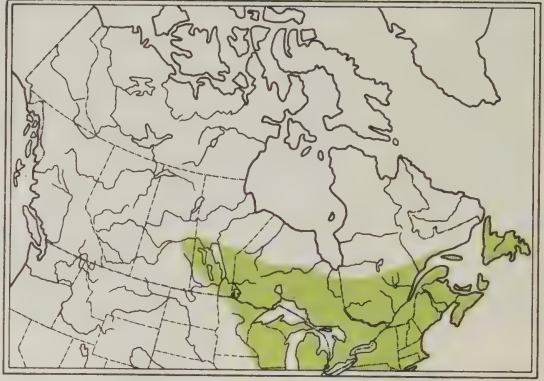
Acer spicatum Lam.

White maple, dwarf maple.

The mountain maple is a small tree or shrub rarely more than 25 feet in height and 5 to 7 inches in diameter. It is the smallest of our eastern maples and is seen more often as a shrub than as a tree. The trunk is usually short and supports an irregular crown of slender, brittle, mostly upright branches. The root system is usually very shallow, seldom penetrating more than a few inches below the surface of the ground.

This species is found throughout Eastern Canada and extends from Newfoundland to Saskatchewan. It prefers rich soils on moist rocky slopes and flats, and along small streams, where it frequently forms the major part of the shrubby undergrowth. It seems to require a certain amount of shade for, with the exception of recently cut-over woodlands, it is rarely found growing in the open. It reproduces readily by suckers which may arise from surface roots and prostrate branches, and from around the root collar.

This maple is easily recognized by its slightly stalked, somewhat downy buds, coarse-toothed, mostly 3-lobed leaves, and conspicuous clusters of yellowish flowers borne on an erect, spike-like stem.



LEAVES—Opposite, simple, usually 3-lobed with shallow V-shaped notches, sharp-pointed, coarse-toothed, 4 to 5 inches long; yellowish-green above, paler, more or less hairy below.

FLOWERS—June, after the leaves; unisexual; yellow; the male at the top, the female at the bottom of a long, many-flowered, upright stem.

FRUIT—September; a pair of brown (bright red or yellow during the summer) terminally winged samaras, about $\frac{3}{4}$ of an inch long, with diverging wings; falling at maturity.

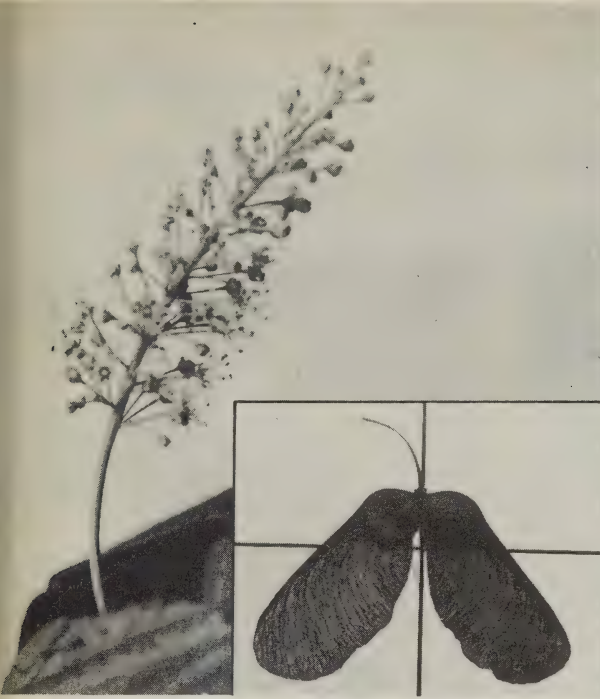
TWIGS—Slender, more or less downy, bright red. Terminal bud about $\frac{1}{8}$ of an inch long, bright red, minutely downy, slightly stalked; lateral buds similar.

BARK—Thin, reddish to greyish-brown, smooth or slightly furrowed.

WOOD—Light, soft, weak, fine-grained, diffuse-porous; light brown with paler sapwood.

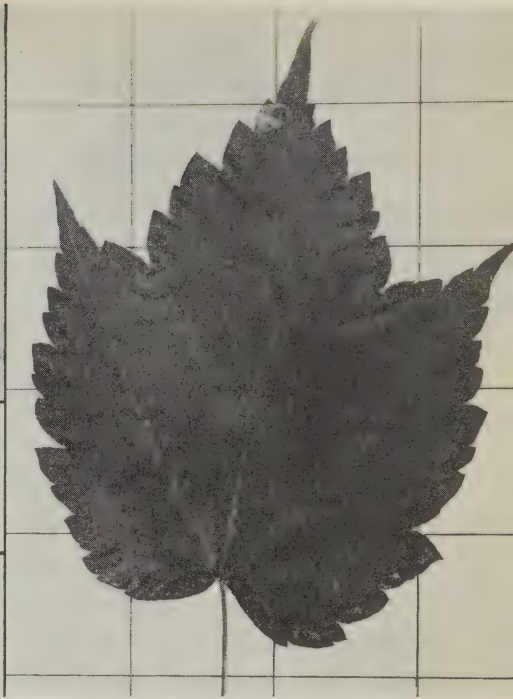
The wood of mountain maple has no economic importance. The tree is sometimes planted for ornamental purposes and may have some value in preventing erosion on rocky slopes.

MOUNTAIN MAPLE



FLOWERS

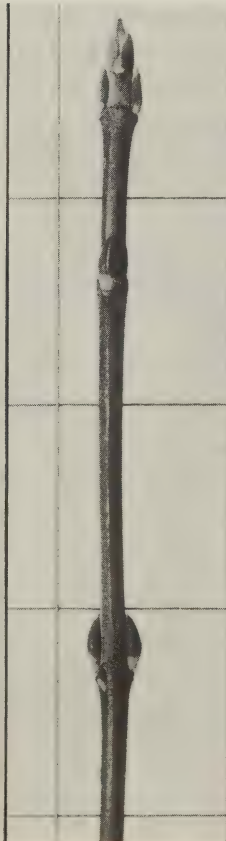
FRUIT (SAMARAS)



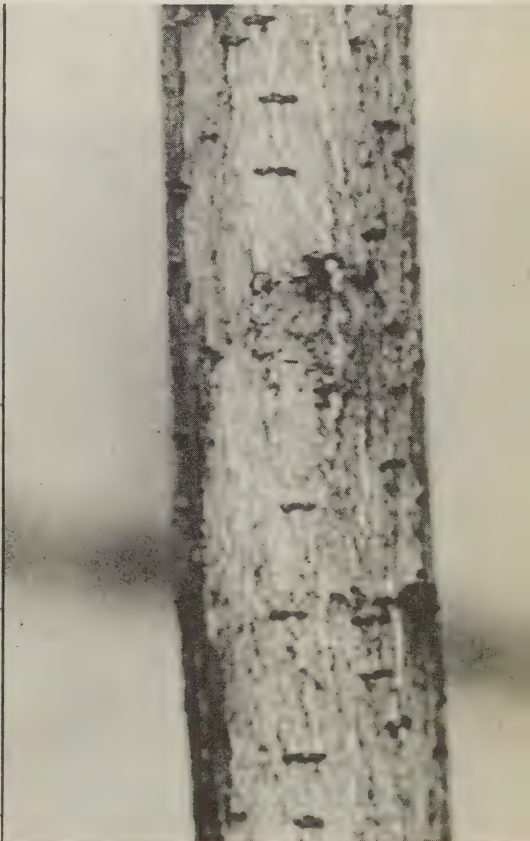
LEAF



FRUIT CLUSTER



WINTER TWIG



BARK

STRIPED MAPLE

Acer pensylvanicum L.

Moosewood, moose maple.

The striped maple, like the mountain maple with which it is frequently associated, is a tall shrub or small tree, commonly 10 to 20 feet in height, sometimes under very favourable conditions reaching heights of 30 to 40 feet and diameters up to 10 inches. The trunk is usually short, rarely rising more than a few feet above the ground before it divides into several straight, mostly upright limbs which form a broad deep crown. The smaller branches are straight, slender, and brittle.

Striped maple is found from Cape Breton Island and the lower St. Lawrence River Valley westward to Lake Superior. It prefers cool moist soils on northern slopes and in valleys where it is protected from the direct rays of the sun. Frequently it forms a large part of the shrubby understory beneath mixed stands of red spruce, eastern hemlock, yellow birch, beech, and sugar maple.

This tree is named for its smooth green bark which shows vertical white streaks where the bark has split open; these usually appear after the second year.



LEAVES—Opposite, simple, 3-lobed with shallow notches, sharp-pointed, coarse-toothed, 4 to 6 inches long, thin; pale green above, paler below.

FLOWERS—May-June, after the leaves; mostly unisexual; in elongated drooping yellow clusters, male and female usually on separate trees.

FRUIT—August-September; a pair of greenish terminally winged samaras about 1 inch long, the wings spreading at a very wide angle and the seed cavity pitted on one side.

TWIGS—Moderately stout, smooth, reddish-brown or greenish. Terminal bud about ½-inch long, covered by 2 bright red scales, appearing stalked; lateral buds similar.

BARK—Thin, smooth, green or reddish-brown, marked with conspicuous white stripes.

WOOD—Light, soft, weak, straight-grained, diffuse-porous; light brown with paler sapwood.

The wood is not used commercially. The buds and twigs provide winter food for deer and moose, and the latter eat the leaves in summer, hence the names moosewood and moose maple.

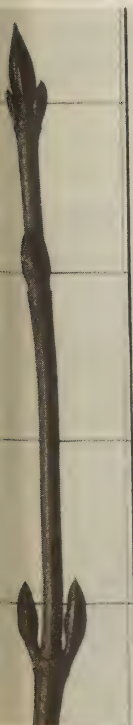
STRIPED MAPLE



FRUIT CLUSTER (SAMARAS)



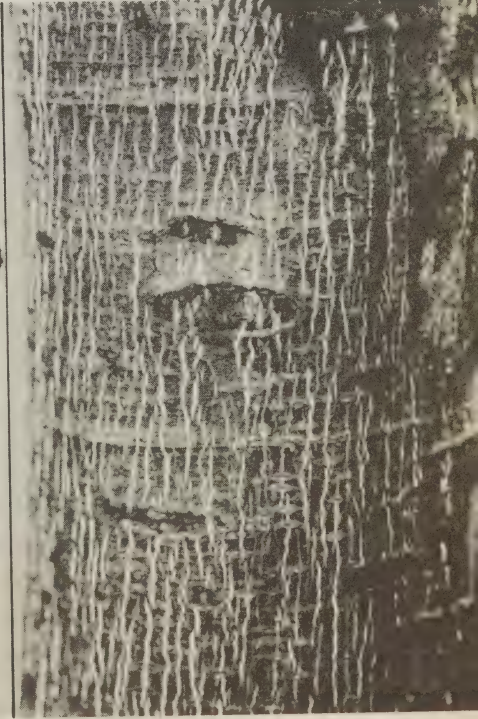
LEAF



WINTER TWIG



FLOWERS



STRIPED BARK

THE MAPLES

DOUGLAS MAPLE

Acer glabrum Torr.
var. *douglasii* (Hook.) Dipp.

**Dwarf maple, red maple, mountain maple,
Rocky Mountain maple.**

The Douglas maple is occasionally a small tree 20 to 25 feet high and 6 to 8 inches in diameter, but more often it is an upright shrub under 10 feet in height. It forms a narrow crown of small, slender, sharply ascending branches.

This maple is found from Alaska southward along the Pacific Coast, throughout central and southern British Columbia, and on the east slope of the Rocky Mountains in Alberta. It grows singly and in small clumps on thin, usually gravelly soil along gulches, mountain streams, cliffs, and canyon sides, with mountain alder, white birch, trembling aspen, and serviceberry.

The species, *Acer glabrum* Torr., the Rocky Mountain maple of the northwestern United States, is a shrub or small tree distinguished by double-toothed, 3- to 5-lobed leaves, with the lobes entire below the middle and frequently extending almost to the midrib or right to the base (a compound leaf), and fruit with relatively narrow, somewhat spreading wings.



LEAVES—Opposite, simple, usually 3-lobed, with broad shallow notches, sharp-pointed, coarse-toothed, 2 to 4½ inches long; dark green above, paler below.

FLOWERS—Spring, with the leaves; mostly unisexual on different trees, borne in small, greenish-yellow clusters.

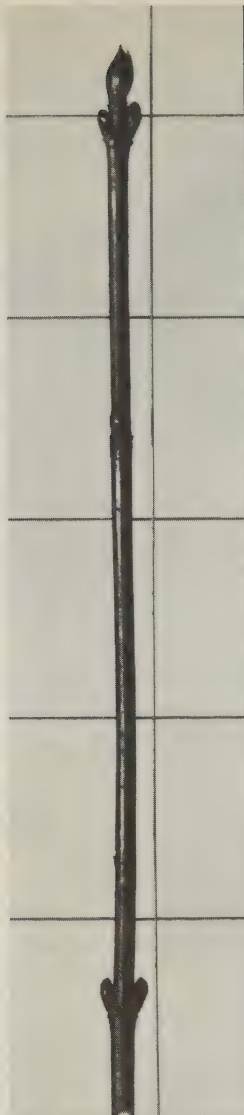
FRUIT—Early autumn; a pair of light brown, terminally winged samaras, 1 to 1¼ inches long, with broad, nearly erect wings; falling at maturity.

TWIGS—Slender, smooth, bright red. Terminal bud sharp-pointed, 1/8 to 1/4 of an inch long; bright red, similar to the lateral buds.

BARK—Thin, smooth, red-brown.

WOOD—Heavy, hard, fine-textured, diffuse-porous; whitish to light brown.

The Douglas maple is of no commercial importance.



WINTER
TWIG ►



LEAF



FRUIT
(PAIRED SAMARAS)



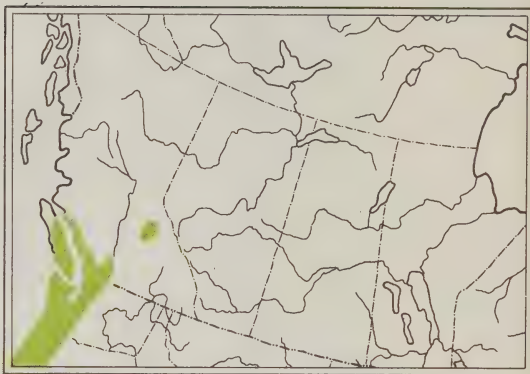
VINE MAPLE

Acer circinatum Pursh

Mountain maple.

The vine maple is usually a shrub. The trunk, which is 3 to 6 inches in diameter and 10 to 30 feet in length, is often prostrate and has a crooked crawling appearance, especially in forests where snow has bent the long slender branches to the ground. It grows in the shade of other trees and is frequently found extending its stem toward some open spot. Where the stem touches the ground it frequently takes root. The crown of crooked limbs is irregular and open.

Vine maple is found in Canada on Vancouver Island and the adjacent mainland, and in Wells Grey Park in the interior of British Columbia. It prefers rich moist rocky soils along streams, around low meadows, on benches, and in depressions. It occurs in clumps and patches, and as scattered trees in the understory to broadleaf maple, amabilis fir, Douglas fir, and western yew. The openings left by the removal of larger trees are often completely occupied by this species.



LEAVES—Opposite, simple, nearly circular in outline with 7 or 9 sharp-pointed lobes, sharp-toothed, 2 to 7 inches long; dark green above, paler, more or less hairy below.

FLOWERS—Late spring, after the leaves; male and female together; in purple and white clusters.

FRUIT—Late autumn; a pair (occasionally 3 or 4 in a cluster) of yellowish-brown, terminally winged samaras, up to 2 inches long, the wings spreading almost horizontally; falling at maturity.

TWIGS—Slender, smooth, pale green to reddish-brown, frequently with a white bloom. Terminal bud about 1/8 of an inch long, blunt, bright red; lateral buds similar.

BARK—Thin, smooth, greyish or reddish-brown, slightly furrowed on old trunks.

WOOD—Heavy, hard, fine-textured, diffuse-porous; light brown with paler sapwood.

Vine maple has no commercial value. It is sometimes used locally for fuelwood and may be of value in controlling erosion on recently cut areas.



LEAVES AND FRUIT

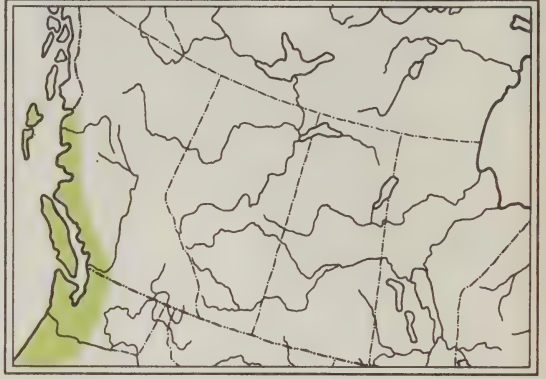
BROADLEAF MAPLE

Acer macrophyllum Pursh

Broad-leaved maple, bigleaf maple, Oregon maple, British Columbia maple.

The broadleaf maple is the largest species of maple occurring in British Columbia. It is frequently a medium-sized tree 50 to 70 feet in height and 2 feet or more in diameter; occasionally on the best sites it reaches a height of 100 feet. On poor soils it is often short-stemmed, crooked, and not over 25 feet in height. Forest-grown trees develop a long clear trunk with a short narrow crown of ascending branches. On more open sites the trunk usually breaks up a short distance above the ground into several large limbs which spread out to form a broad oval crown.

This species does best on a moist gravelly soil, and where there is an abundance of rainfall. It rarely forms pure stands, but usually occurs scattered or in small groups in mixed stands of Douglas fir, western red cedar, western hemlock, red alder, and black cottonwood. In Canada it is confined to the coast and islands of British Columbia.



LEAVES—Opposite, simple, deep 5-lobed, the lobes entire or notched, blunt, 6 to 12 inches long; dark green, shiny above, paler below.

FLOWERS—April-May, after the leaves; unisexual and bisexual; in long drooping greenish-yellow clusters.

FRUIT—Autumn; a pair (sometimes 3 or 4) of yellowish-brown, terminally winged samaras, $1\frac{3}{4}$ to $2\frac{1}{2}$ inches long with broad slightly diverging wings, the nutlets coated with yellow hair; falling late in the autumn and early in the winter.

TWIGS—Stout, smooth, green to dark red. Terminal bud blunt, dark red, about $\frac{1}{4}$ of an inch long; lateral buds smaller.

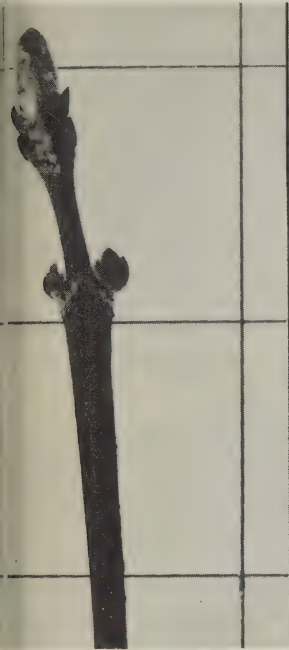
BARK—Smooth, grey-brown at first, becoming reddish-brown, furrowed into hard scaly ridges on old trunks.

WOOD—Moderately heavy and hard, not strong, fine-textured, diffuse-porous; pinkish-brown with reddish-white sapwood.

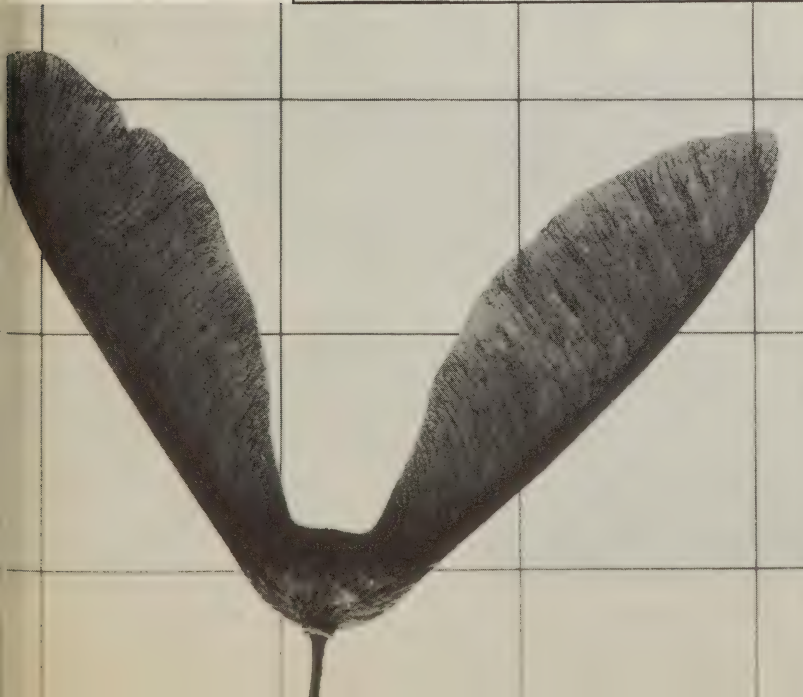
The limited supply of suitable hardwood in British Columbia makes this species of considerable local importance for flooring, furniture, cabinet-work, interior finish, and other uses where a hardwood is preferred.

BROADLEAF MAPLE

FIVE-LOBED LEAF



WINTER TWIG



FRUIT
(PAIRED SAMARAS)



THE MAPLES

SUGAR MAPLE

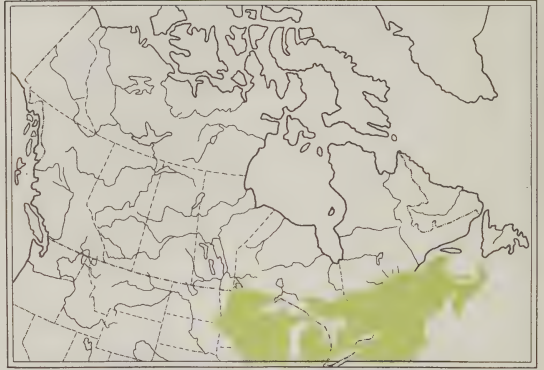
Acer saccharum Marsh.

Hard maple, rock maple, black maple, curly maple, bird's-eye maple.

The sugar maple is one of the tallest hardwoods in Canada, sometimes reaching a height of 130 feet and a diameter of 5 feet, with an average of 80 to 90 feet in height and 2 to 3 feet in diameter. The trunk is usually long and straight in the forest, short and branched in the open. The crown of slender, mostly ascending, branches is compact and regular. The wide-spreading root system usually goes somewhat deeper than that of the other maples.

The species ranges from the Gulf of St. Lawrence westward to the Lake of the Woods. It requires moist rich well-drained soils for best development, and will not do well on a poor site. It occurs in pure stands, also with red spruce, white spruce, and balsam fir and with such hardwoods as beech, yellow birch, oak, red maple, basswood, ironwood, and hickory.

The sugar maple is one of the most conspicuous features of the Eastern Canadian woods in autumn, its leaves turning to brilliant shades of deep red, scarlet, golden-orange, and bright yellow.



LEAVES—Opposite, simple, 3- to 5-lobed with rounded notches, sharp-pointed, coarse- and irregular-toothed or entire, 3 to 5 inches long; dark green above, paler below.

FLOWERS—May, with the leaves; unisexual and bisexual; in small, greenish-yellow clusters.

FRUIT—Autumn; a pair of reddish-brown, terminally winged samaras, $\frac{3}{4}$ to $1\frac{1}{4}$ inches long, U-shaped, with slightly diverging wings, the seed smooth, about $\frac{1}{4}$ of an inch long; falling soon after maturity.

TWIGS—Slender, shiny, reddish-brown. Terminal bud sharp-pointed, $\frac{1}{4}$ to $\frac{3}{8}$ of an inch long, with brown, hairy scales; lateral buds similar.

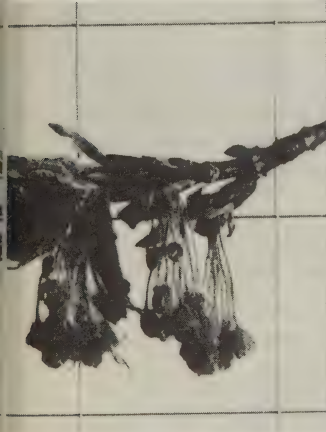
BARK—On young stems, grey, smooth or slightly furrowed; on old trunks, fissured, somewhat scaly.

WOOD—Heavy, hard, strong, fine-textured, diffuse-porous, pale brown with paler sapwood.

The sugar maple is one of the most valuable commercial hardwoods in Canada, and is especially desirable where strength and resistance to wear are necessary. The "bird's-eye" and "curly grain" figures are in great demand. Typical uses are for furniture, veneer and plywood, and vehicle stock. The sap is the principal source of the maple syrup and maple sugar of commerce.



MALE FLOWERS



FEMALE FLOWERS



FIVE-LOBED LEAF

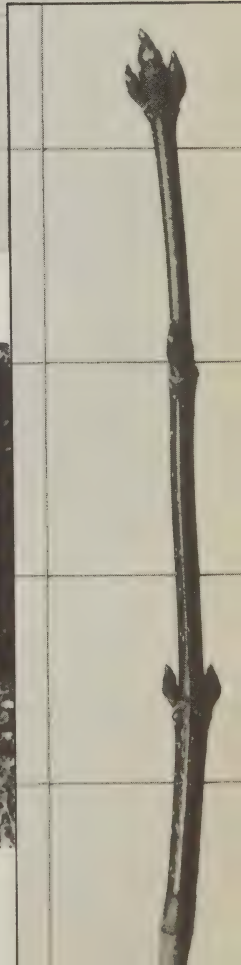


FRUIT (SAMARAS)



MATURE BARK

WINTER TWIG ►



BLACK MAPLE

Acer nigrum Michx. f.

Hard maple, rock maple.

The black maple closely resembles the sugar maple in general appearance and in many botanical characteristics, and some botanists prefer to class it as a variety of the sugar maple rather than as a distinct species.

It is a large tree, frequently 80 to 90 feet in height and upwards of 2 feet in diameter. The trunk of a tree grown in the forest is commonly long and straight, has little taper, and extends well up into the crown. In the open it is short and often divided into several large upright limbs. The crown is compact and round-topped.

This species is limited in Canada to a small corner of southwestern Quebec and to southern Ontario. It is found on rich moist well-drained soils along streams and on bottomlands and lower slopes. It occasionally forms pure stands, but more often is associated with mixtures of yellow birch, beech, basswood, white ash, oak, ironwood, and hickory.

Black maple is distinguished from sugar maple by its leaves, which are usually 3-lobed, drooping, and covered below and on the stem with a dense coat of soft hair, and by its nearly black bark. The flowers and fruits of the 2 species are almost identical.



LEAVES—Opposite, simple, mostly 3-lobed with rounded notches, sharp-pointed, toothless, more or less drooping, 3 to 5 inches long, usually thickened; dull dark green above, yellow-green and nearly always hairy below and on the stem.

FLOWERS—April-May, with the leaves; unisexual or bisexual; in small yellowish-green clusters.

FRUIT—October; a pair of brown, terminally winged samaras about 1 inch long, the wings V-shaped, slightly diverging; falling soon after maturity.

TWIGGS—Rather stout, downy at first, soon shiny, orange-brown or greyish-brown, marked by conspicuous lenticels. Terminal bud sharp-pointed, greyish-brown, hairy, about $\frac{1}{4}$ of an inch long; lateral buds similar.

BARK—Smooth, grey at first; becoming nearly black, furrowed into hard, scaly ridges on old trunks.

WOOD—Heavy, hard, strong, fine-textured, diffuse-porous; pale brown with paler sapwood.

The wood of the black maple has the same physical properties as the sugar maple. Both species are commonly sold under the trade name of "hard" maple. Like sugar maple it is used for veneer and plywood, vehicle stock, and furniture.

BLACK MAPLE

WINTER
TWIG



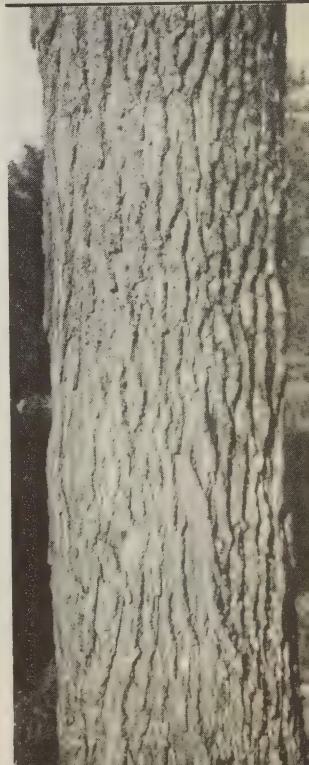
LOBED
LEAF



FRUIT
(PAIRED
SAMARAS)



MATURE
BARK



THE MAPLES

RED MAPLE

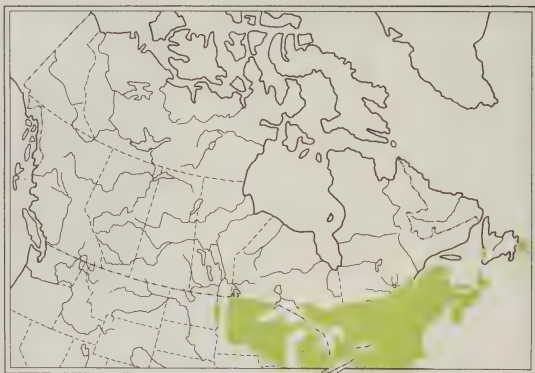
Acer rubrum L.

Soft maple, scarlet maple, swamp maple, water maple.

The red maple attains a height of 70 to 90 feet with a maximum trunk diameter of 3 or 4 feet when growing on deep moist soils. On poor dry soils, and in the northern part of its range, it is usually a shrub and frequently prostrate. The trunk is long and straight in the forest, short and commonly divided into several secondary stems in the open. The main branches have an upright growth, the smaller branches and twigs spread out and tend to turn up slightly at the ends. The roots are usually shallow and wide-spread.

It ranges from southern Newfoundland to the Lake of the Woods on the Ontario-Manitoba boundary and is found mostly on rich moist lands and along the borders of streams and swamps. Although a common tree throughout its range, it is not plentiful anywhere in Canada.

The name, red maple, is most appropriate for this tree. Its twigs, winter buds, flowers and fruits, the stems of the leaves, and, in the autumn, the leaves themselves, are often bright red in colour.



LEAVES—Opposite, simple, 3- to 5-lobed with V-shaped notches, sharp-pointed, coarse double-toothed, 2 to 6 inches long; light green above, paler below.

FLOWERS—April-May, before the leaves; unisexual and bisexual; in small red (rarely yellowish) clusters, with petals.

FRUIT—May-June; a pair of red to red-brown, rarely yellowish, terminally winged samaras, $\frac{3}{4}$ to $1\frac{1}{4}$ inches long, the wings diverging slightly; falling at maturity.

TWIGS—Slender, smooth, shiny, dark red. Terminal bud dark red, blunt; about $\frac{1}{5}$ of an inch long; lateral buds similar.

BARK—Smooth, light grey or reddish-brown at first; becoming dark grey and breaking into long, narrow, scaly plates.

WOOD—Heavy, relatively hard, not strong, fine-textured, diffuse-porous; light brown with white sapwood.

Red maple is not an important timber species. The wood is very similar to sugar maple and is used for the same purposes, except for the more exacting requirements. It is used in the manufacture of furniture, vehicle stock, and veneer and plywood. The tree is sometimes planted as a shade tree along town and city streets.

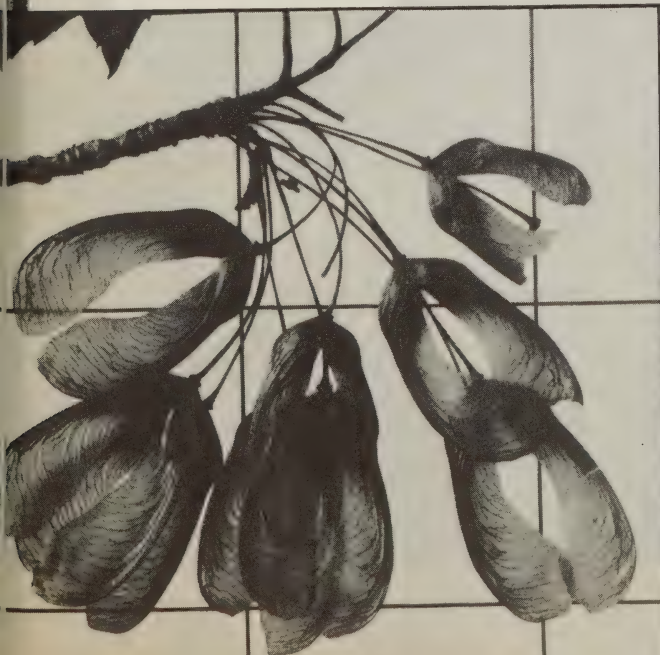
WINTER
TWIG



LEAF



FRUIT CLUSTER
(SAMARAS)



MATURE BARK

SILVER MAPLE

Acer saccharinum L.

White maple, soft maple, swamp maple, river maple, water maple, broad-fruited maple.

The silver maple is a large tree averaging 80 to 90 feet in height and 2 to 3 feet in diameter, sometimes reaching 125 feet in height and 5 feet in diameter. Unless grown in a dense stand, the trunk divides near the ground into several stout, mostly upright, limbs which gradually spread out to form a moderately wide crown of slender, drooping, smaller branches. The tendency for the smaller branches to grow downward and then turn up again at the tips is a characteristic of this species, and is more marked than with the red maple. The root system is usually quite shallow.

The silver maple occurs from southwestern New Brunswick westward through southern Quebec and Ontario. It is commonly found on deep rich moist soils, such as bottom-lands, islands, and along the borders of swamps, but will also grow on a drier site. It never occurs in pure stands.

Very rapid growth and handsome foliage make this species a desirable ornamental tree. Several horticultural forms have been developed, of which one of the commonest is the cutleaf, weeping, or Wier maple, var. *laciniatum* (Carr.) Pax, with very narrow, deep-cleft lobes and long, pendent branches.



LEAVES—Opposite, simple, 5-lobed with deep narrow indentations, sharp-pointed, irregular-toothed, 3 to 6 inches long; pale green above, silvery-white below.

FLOWERS—April-May, before the leaves, unisexual or rarely bisexual; greenish-yellow, without petals; male and female on the same or different trees.

FRUIT—May-June; a pair of yellowish-green, terminally winged samaras, 1 to 2½ inches long, with widely diverging wings; falling at maturity.

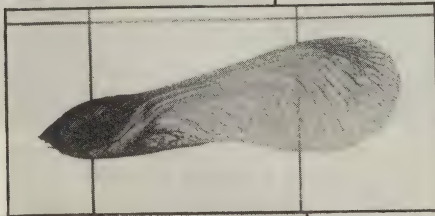
TWIGS—Moderately stout, shiny, red to orange-brown. Terminal bud about 1/5 of an inch long, blunt, bright red; lateral buds similar.

BARK—Thin, smooth, grey with a reddish tinge on young stems; becoming darker, more or less furrowed, and broken into loose scales on old trunks.

WOOD—Moderately hard and heavy, not strong, fine-textured, diffuse-porous; usually light brown with white sapwood.

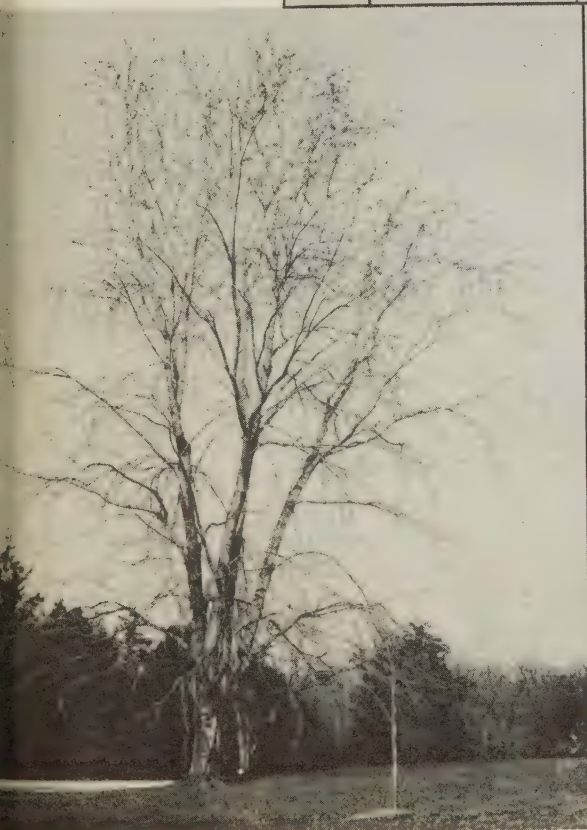
The wood of the silver maple is similar to but softer than that of the red maple. It is also used for furniture and vehicle stock and other uses where the hardness and strength of sugar maple are not important factors.

SILVER MAPLE

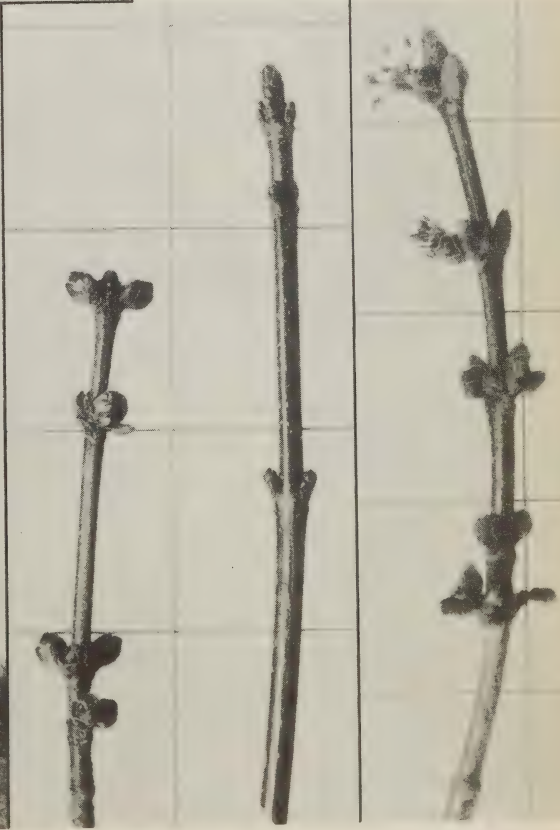


LEAF
FRUIT (SAMARA) ▶

CUTLEAF MAPLE LEAF



TREE, CENTRAL EXPERIMENTAL FARM, OTTAWA



WINTER TWIGS

OPENING
FLOWER BUDS

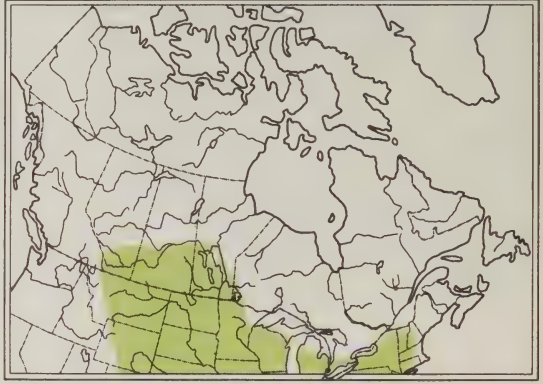
MANITOBA MAPLE

Acer negundo L.

Box-elder, ash-leaf maple, inland box-elder, inland Manitoba maple.

Two forms of the Manitoba maple are found in Canada. They are small to medium-sized trees 40 to 50 feet in height and about 1 foot in diameter, occasionally under favourable conditions reaching 60 to 70 feet in height and 2 to 3 feet in diameter. The trunk is often short as it commonly divides near the ground into several stout limbs which gradually spread out into an irregular bushy crown. The root system consists of several moderately deep and spreading laterals.

One form, the species, is an eastern tree originally confined to southern Ontario but which has now, as a result of planting, become naturalized in many parts of the country from Nova Scotia westward. The second, var. *interius* (Britt.) Sarg., is the common maple of the prairie region, ranging from western Ontario to southern Alberta. It closely resembles the species, but may be distinguished by the mostly 3-lobed leaves and the more or less hairy twigs. Both are fond of moist soils and are generally found along streams, around lakes, and at the margins of swamps. They will, however, withstand considerable drought. The Manitoba maples are the only native maples with compound leaves.



LEAVES—Opposite, compound, 6 to 15 inches long, consisting of 3 to 5 (rarely 7 or 9), coarse-toothed, often lobed leaflets (mostly 3, var. *interius*) borne in pairs on a stout smooth or hairy stem. Leaflets 2 to 5 inches long; bright green above, paler, often hairy below.

FLOWERS—May, before or with the leaves; unisexual; in yellow-green clusters; male and female on separate trees.

FRUIT—Autumn; a pair of terminally winged samaras, 1½ to 2 inches long, V-shaped, with diverging wings; borne in elongated clusters; often persistent on the tree until well into the winter.

TWIGS—Stout, smooth, often with a whitish bloom (var. *interius* more or less hairy), green to reddish-purple. Terminal bud blunt, about 1/8 of an inch long, covered with downy bluish-white scales, longer than the lateral buds.

BARK—Light brown or dark grey; on old trunks furrowed into irregular flat-topped ridges.

WOOD—Relatively light and soft, not strong, fine-textured, diffuse-porous; creamy-white to pale brown.

A rapid rate of growth and hardiness against freezing have made these trees popular on the prairies for street and ornamental planting and for shelter-belts. The wood, although not as strong as that of the other maples, is used locally for boxes and rough construction.



FEMALE FLOWERS



COMPOUND LEAF

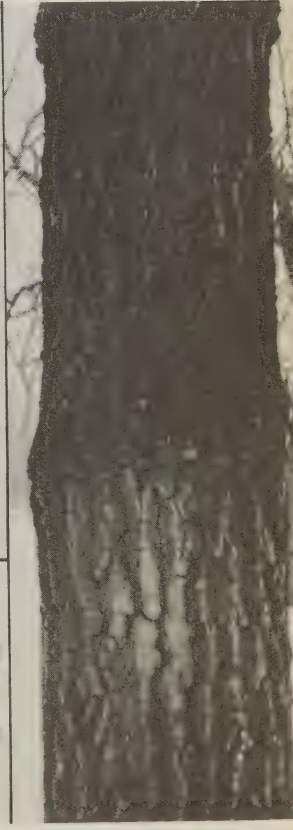
FRUIT



WINTER TWIGS



MALE FLOWERS



MATURE BARK

CASCARA

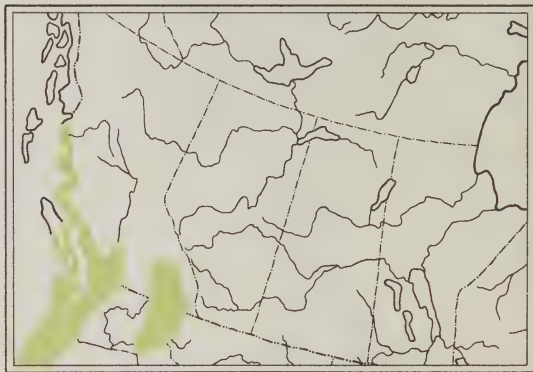
Rhamnus purshiana DC.**Cascara buckthorn, buckthorn, barberry, bearberry.**

On poor sites the cascara is usually a low shrub composed of several large branches which branch off close to the ground. More often it is a small tree up to 20 or, rarely, 40 feet in height, with a straight trunk usually 12 to 15 inches in diameter, but occasionally reaching 30 inches. The trunk is short, rarely more than 15 feet in length before it divides into an open crown of numerous stout ascending spreading branches.

The cascara is found in southern British Columbia, chiefly in the coastal region west of the Cascade Mountains, but it also occurs in the interior, especially at Revelstoke and in the Arrow Lake district. It prefers rich bottom-lands where it forms a part of the shrubby understory beneath the larger Douglas fir, western red cedar, and red alder. Elsewhere it forms pure stands or is associated with arbutus, serviceberries, and other shrubby species.

. . .

Two species of *Rhamnus* L., generally known as buckthorn, are native to Canada. One is the cascara described above, the second, *Rhamnus alnifolia* L'Herit., the alderleaf buckthorn is a small transcontinental shrub.



LEAVES—Alternate (rarely almost opposite), simple, broadly elliptical in outline, rounded or blunt-pointed, fine-toothed or nearly entire, 2 to 7 inches long; light green above, paler and somewhat hairy below.

FLOWERS—June, on the new growth; bisexual; borne in small greenish clusters.

FRUIT—August-September; rounded, berry-like, sweet, bluish-black at maturity, $1/3$ to $1/2$ inch in diameter, containing 2 or 3 small nuts.

TWIGS—Slender, smooth or downy, yellow-green to reddish-brown with a bitter taste. No terminal bud; lateral buds small, without scales, greyish, hairy.

BARK—Thin, brownish, smooth or broken into small, thin scales.

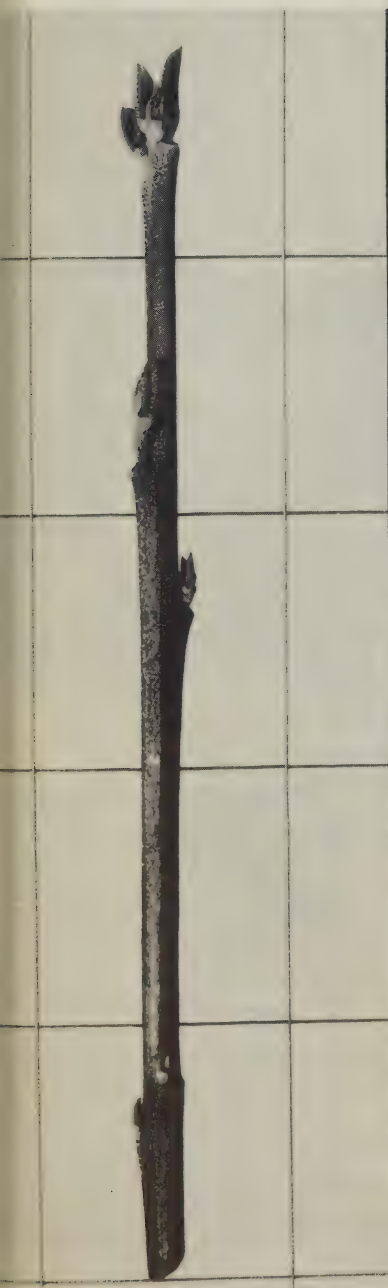
WOOD—Light, soft, brittle, ring-porous; yellowish-brown with paler sapwood.

The value of the cascara lies in its bark, which is the source of the laxative, Cascara Sagrada. The wood is of no commercial importance. The fruit provides food for birds.

FRUIT ▶



WINTER TWIG ▼



LEAF ▶



BASSWOOD

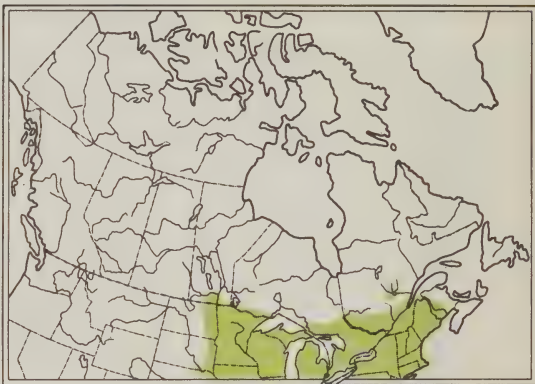
Tilia americana L.

American linden, lime, lime-tree, whitewood.

The basswood is commonly 60 to 70 feet in height and 2 to 2½ feet in diameter, but sometimes attains a height of over 100 feet and diameters up to 4 feet. The trunk extends well up into the crown, and in the forest is straight and frequently clear of branches for much of its length. The narrow, oblong, or pyramidal crown is composed of many relatively small branches. In the open the lower branches frequently droop nearly to the ground. A deep wide-spread system of strong lateral roots make this tree quite windfirm. It reproduces by means of sprouts which arise from around the root collar.

In Canada the basswood is found from the valley of the St. John River in New Brunswick westward to southern Manitoba. It prefers a deep loam soil on low slopes and along streams, but is also found on high rocky ridges. It usually grows in the company of other hardwoods, and it never forms pure stands.

Tilia americana L. is the only basswood positively known to occur in Canada. *Tilia neglecta* Spach, the leaves of which are covered below with short grey down, has been reported near Montreal, but it is best treated as a form of *Tilia americana*.



LEAVES—Alternate, simple, heart-shaped, sharp-pointed, unequal at the base, coarse-toothed, 5 to 6 inches long; dark green above, paler, with tufts of rusty-brown hair in the angles of the veins below.

FLOWERS—July, after the leaves; bisexual; yellow, about ½ inch in diameter; borne in clusters on a common stalk which is attached to a leaf-like bract.

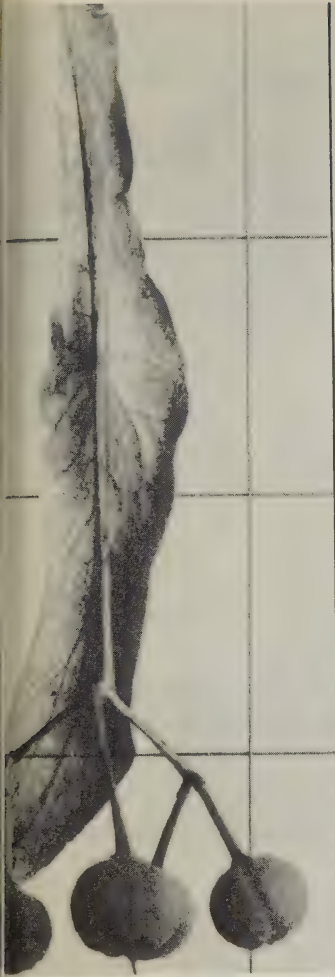
FRUIT—October; a pale brown, nut-like berry, about 1/3 of an inch in diameter, covered with short, brown hair; shed during the autumn and winter.

TWIGS—Slender, zigzag, smooth, shiny, bright red or green. No terminal bud; lateral buds dark red or green, smooth, pointed, lop-sided, about ¼ of an inch long.

BARK—At first dark grey, smooth; becoming furrowed into flat, scaly ridges.

WOOD—Light, soft, straight-grained, diffuse-porous; light brown with paler sapwood.

Basswood is one of the softest and lightest in weight of the Canadian hardwoods. It works exceptionally well and is valued for hand-carving, modelling, and interior trim. It has good gluing characteristics, and its lack of taste or odour make it valuable for food containers.



UIT AND LEAF-LIKE BRACT



LEAF



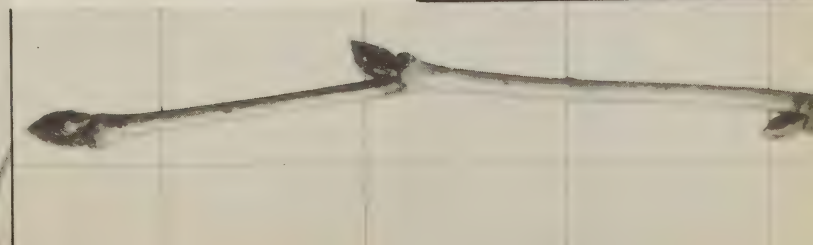
YOUNG BARK



MATURE BARK



WINTER TWIG



BLACK GUM

Nyssa sylvatica Marsh.

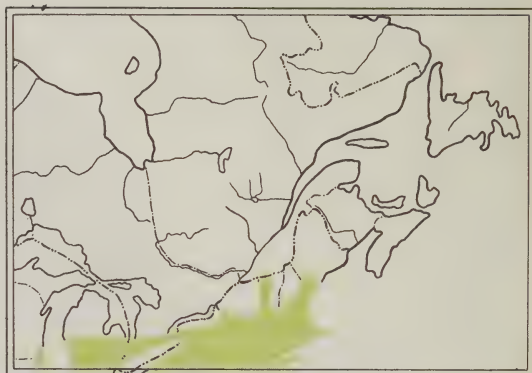
Sourgum, tupelo, black tupelo, pepperidge.

The black gum is a medium-sized tree averaging about 60 feet in height and 1 to 2 feet in diameter. The trunk is symmetrical and commonly extends well up into the crown. The branching is very irregular and in the open may extend nearly to the ground. The lower branches are usually drooping, the middle ones spread out horizontally, and the top branches are mostly upright. The smaller branches often develop numerous short, stout, spur-like shoots. The crown in old trees is frequently flat-topped or even stagheaded, i.e., dead at the top.

The Canadian range of the black gum is limited to that part of southern Ontario bordering on Lake Erie and Lake St. Clair, where it is often found in swamps and along the edges of streams. It may occur also on hillsides and abandoned farm lands.

Black gum is easily recognized by its oval, mostly entire leaves and berry-like fruit.

Six species of *Nyssa* L. are known. Four occur in the eastern portion of this continent and 2 in Asia. The black gum is the only one found in Canada.



LEAVES—Alternate, simple, oval in outline, blunt-pointed, entire or rarely coarse-toothed, 2 to 5 inches long; shiny, dark green above, paler, often downy below.

FLOWERS—May-June, with the leaves; unisexual or bisexual; borne in small, greenish clusters; male and female nearly always on separate trees.

FRUIT—September-October; berry-like, dark blue, sour to the taste, about $\frac{1}{2}$ inch long, containing a single ridged seed.

TWIGS—Slender, more or less downy, reddish-brown. Terminal bud dark red, downy, blunt, about $\frac{1}{4}$ of an inch long; lateral buds similar.

BARK—Dark grey tinged with red; rough, deep-grooved, broken into many-sided plates.

WOOD—Moderately heavy, relatively hard, strong, tough, diffuse-porous; greenish or brownish with thick, paler sapwood.

Black gum seldom reaches commercial size in Canada. Its wood may be used for decorative types of veneer and plywood, and where resistance to wear is important.

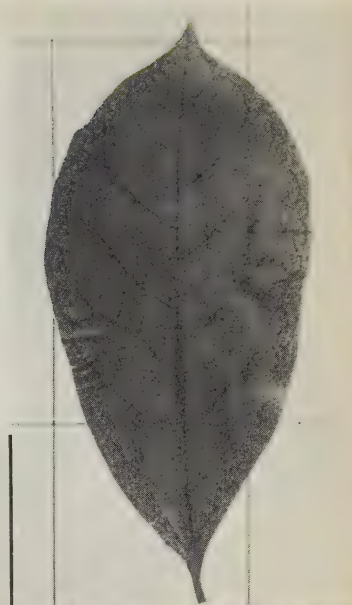
BLACK GUM



LEAVES
AND
FRUIT



LEAF



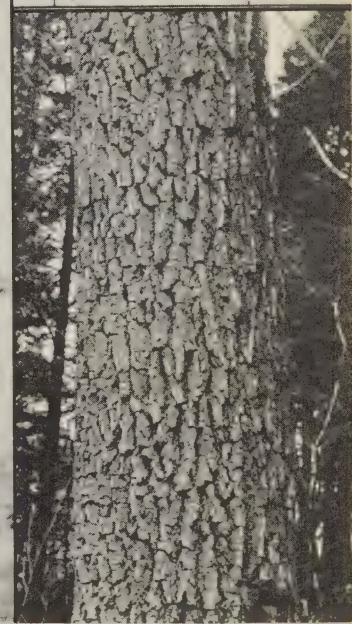
WINTER TWIG



SPUR SHOOT



FLAT-TOPPED TREE, NIAGARA, ONT.



MATURE BARK

The DOGWOODS *Cornus* L.

The dogwoods comprise about 50 species of herbs, shrubs, and small trees, mostly confined to the temperate regions of the Northern Hemisphere. Fourteen or more species are found in Canada, of which 2 are herbs and 4 are either large shrubs or small trees. The remainder are distinctly shrubby at all times.

The Canadian dogwoods are characterized by deciduous, opposite (in one species alternate), simple leaves; small white to greenish bisexual flowers which are arranged in showy clusters and on many species are surrounded by either 4 or 6 large, petal-like bracts; and clustered red, white, or blue berry-like fruit. The twigs are smooth, usually highly coloured, and always have a terminal bud. The leaves are oval to rounded in outline, have entire or slightly wavy margins, and are generally clustered toward the ends of the twigs. The veins are indented on the upper side and characteristically curved to follow the outline of the leaf.

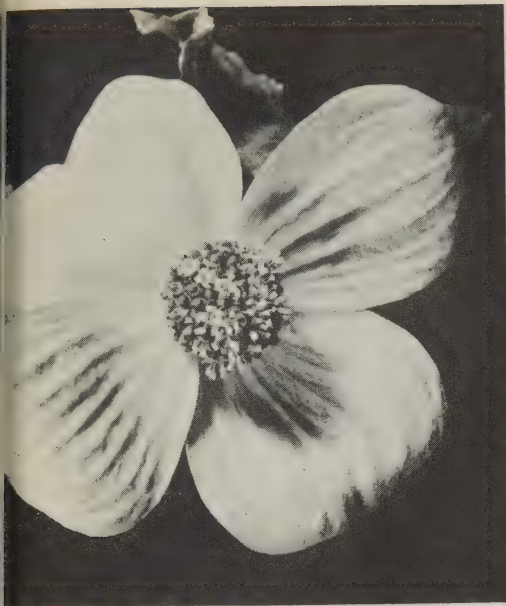
The eastern flowering dogwood or boxwood, *Cornus florida* L., is a small bushy tree rarely more than 30 feet in height and 1 foot in diameter, found in the Niagara District of Ontario, and westward to Lake St. Clair. The single pair of scales on the terminal bud of the twig and the presence of many large top-shaped flower buds distinguish it from any of the maples or ashes during the winter. The greenish flower clusters are surrounded by 4 large white petal-like bracts, making the plant a conspicuous object in the spring. The fruit ripens to a bright red colour in the autumn.

The western flowering dogwood, or Pacific dogwood, *Cornus nuttalli* Audubon, is found in the lower Fraser Valley and on Vancouver Island in British Columbia. It is a small tree commonly 20 to 40 feet in height and about 7 inches in diameter, though occasionally 60 feet high and 18 inches in diameter. It closely resembles the eastern flowering dogwood, but is easily separated from that species by the shape of the flower bracts, which, on the western species, are pointed at the tip while those of the other are indented at the end. Usually there are 6 of these bracts around the flower cluster.

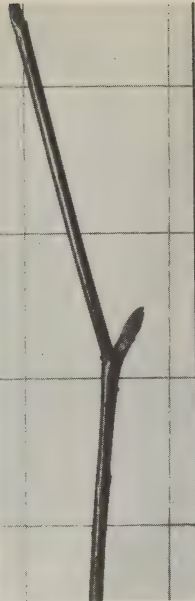
The alternate-leaf dogwood, *Cornus alternifolia* L.f., ranges from Cape Breton Island and the north shore of the St. Lawrence River in eastern Quebec to southern Manitoba. It is a shrub or small tree with a low spreading crown of nearly horizontal branches and numerous short smooth upright twigs and branchlets, dark green or purplish, often streaked with white. This is the only Canadian dogwood with alternating leaves and twigs. The flowers are cream-coloured and lack the petal-like bracts. The fruit is blue at maturity.

The roughleaf dogwood, *Cornus drummondii* C. A. Mey., has been reported from Point Pelée and Pelée Island in Ontario. It is usually a shrub, occasionally a small tree, with slender spreading branches and shiny red twigs spotted and roughened by numerous pale lenticels. The leaves are dark green and roughened above by short stiff hairs, hence the name "roughleaf". The cream-coloured flowers are borne in rather loose clusters and do not have the petal-like bracts which are characteristic of the flowering dogwoods. The fruit is white.

The wood of all species is heavy, hard, fine-textured, and homogeneous, so that it withstands abrasion and wears smooth under friction.



FLOWER
WESTERN FLOWERING DOGWOOD



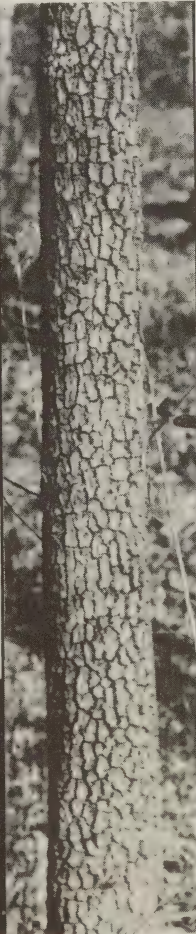
WINTER TWIG



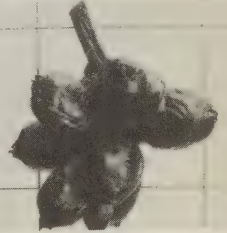
LEAVES
ALTERNATIVE-LEAF DOGWOOD



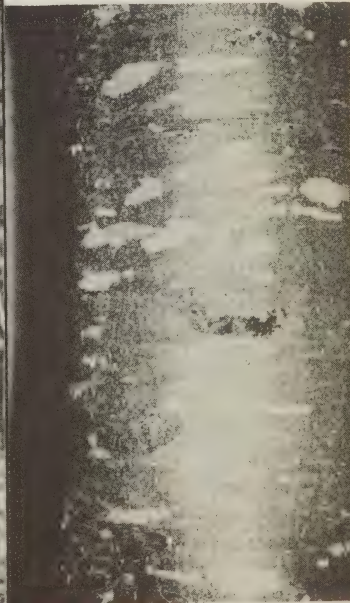
LEAVES AND FLOWERS
WESTERN FLOWERING
DOGWOOD



MATURE BARK
EASTERN
FLOWERING
DOGWOOD



FRUIT, WESTERN
FLOWERING DOGWOOD



BARK
WESTERN FLOWERING
DOGWOOD

ARBUTUS

Arbutus menziesii Pursh

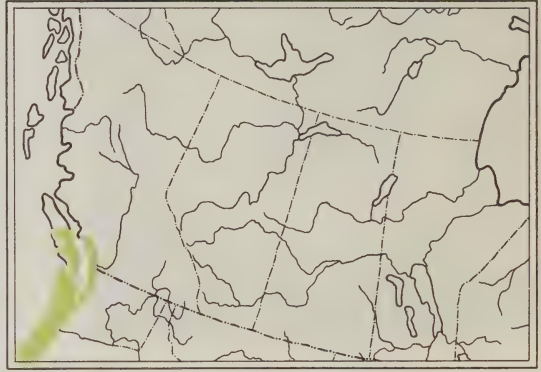
Madrone, madrona, manzanita.

The arbutus is easily identified by its shiny dark green leaves, which remain green all winter, and by the bright red bark on its trunk and branches. It is the only broad-leaved evergreen native to Canada. It is commonly a low, shrubby tree, seldom more than 30 to 40 feet in height and 12 to 20 inches in diameter, with a crooked, often leaning, trunk and twisted branches. The crown is narrow on young trees becoming broad and irregularly rounded with age.

This tree is found in British Columbia on the coastal islands and on both sides of the Straits of Georgia, extending as far north as Bute Inlet on the mainland and Seymour Narrows on the east side of Vancouver Island. It is limited to relatively narrow strips along the coasts, mostly below 1,000 feet in altitude. It grows on a variety of sites, from rich bottom-lands to almost bare rocky slopes, but is usually found on a dry soil in exposed situations. It forms pure stands or is found in the understory to Douglas fir, broadleaf maple, and Garry oak.

. . .

Twelve species of *Arbutus* L. are known to exist either as shrubs or small trees. Three are found in the United States but only one extends into Canada.



LEAVES—Alternate, simple, oval in outline, rounded or blunt-pointed, entire on old growth, fine-toothed on new shoots, thick, leathery, 2½ to 5 inches long; shiny, dark green above, silvery-white below.

FLOWERS—April-May; bisexual, white, about 1/3 of an inch long, borne in large, showy clusters.

FRUIT—Autumn; rounded, berry-like, bright orange-red at maturity, up to ½ inch in diameter, containing numerous small seeds.

TWIGS—Slender, often hairy, green, red, or brown; buds brown with overlapping scales.

BARK—Smooth or with loose scales, bright red, separating into long thin strips.

WOOD—Heavy, hard (when dry), fine-grained, diffusely porous; light reddish-brown with paler sapwood.

The wood is too rare to be of any great commercial importance. It is suitable for fuel, flooring, small cabinet-work, and small wood turnery. The bark is sometimes used for tanning leather.



LEAVES



FRUIT CLUSTER

The ASHES *Fraxinus* L.

There are about 65 species of ash found throughout the Northern Hemisphere. Sixteen species are known to occur in North America, of which 4, the blue, black, white, and red ashes are found in Canada. These are all eastern trees, 1 extending as far west as Lake Winnipeg in Manitoba. Two varieties of the red ash, the green ash and the northern red ash, also occur in Canada. They extend westward to eastern Alberta and southern Manitoba respectively. The Oregon ash, *Fraxinus oregona* Nutt., a native of Washington and Oregon, has been reported from southern British Columbia but its occurrence there has not been established. The European ash, *Fraxinus excelsior* L., is occasionally planted in Canada for shade and ornamental purposes. It resembles the native black ash in many respects.

The Canadian species of ash are small to large deciduous trees with opposite compound leaves, very stout twigs, somewhat compressed terminal buds, and more or less deep-furrowed scaly bark. The flowers are either unisexual or bisexual, sometimes both, depending upon the species. They appear in clusters in the spring, usually before the leaves. The fruit, an elongated, oblong, or paddle-shaped samara, is borne in loose clusters along the twigs and matures in the autumn of the first year. It consists of an elongated seed cavity winged at one end by a thin narrow wing which in some species extends part way, in others all the way to the base. Occasionally 2- or 3-seeded fruits with an equal number of attached wings are found.

The ashes are noted for their tough, elastic, straight-grained wood which, with the exception of black ash, is generally sold as white ash. It is used in Canada chiefly for vehicle stock, tool-handles, interior finish, and sporting goods. The wood of the black ash is somewhat inferior in strength to the other native species.



RED ASH NEAR THURSO, QUE.

WHITE ASH

Fraxinus americana L.

Canadian white ash, American ash.

The white ash is commonly a medium-sized tree 50 to 60 feet in height and 2 to 3 feet in diameter, but when growing in a close stand sometimes reaches a height of 100 feet. The trunk is tall and straight, and even when grown in the open rises to a good height before separating into branches. The crown of moderately stout spreading or ascending branches is broadly rounded to pyramidal in outline. The root system usually penetrates deeply into the ground.

White ash is a common and well-known tree from Cape Breton Island to the lower end of Lake Superior. It will thrive on a wide range of sites, but makes its best growth on a deep, well-drained soil along streams and on lower slopes in protected situations, where it is found scattered or in small groups among other hardwoods. It never forms pure stands.



LEAVES—Opposite, compound, 8 to 12 inches long, composed of 5 to 9 long-stalked leaflets borne in pairs on a stout, smooth stem. Leaflets oval to lance-shaped, sharp-pointed, entire or sparsely toothed, 3 to 5 inches long; dark green, smooth above, paler, and smooth or slightly hairy below.

FLOWERS—May-June, before or with the leaves; unisexual; male and female on different trees; borne in stout clusters.

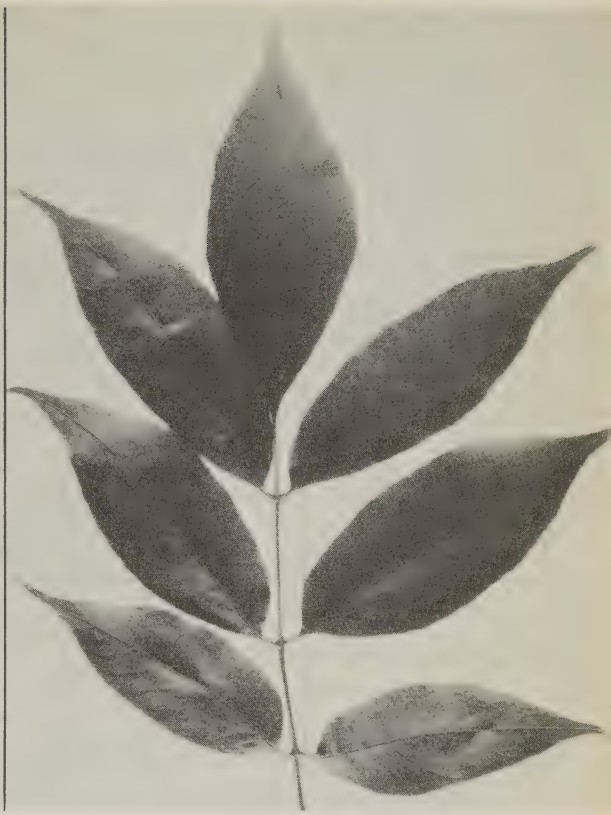
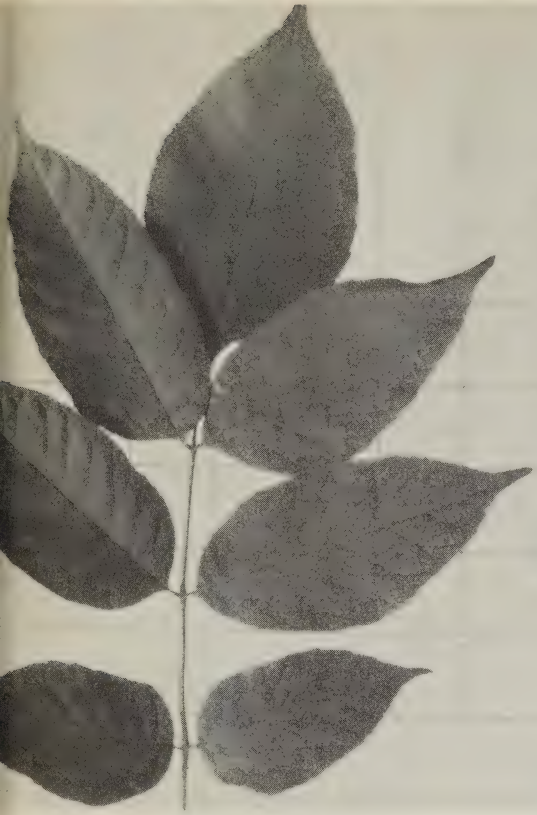
FRUIT—Late summer; an elongated samara, 1 to 2½ inches long; the thin wing rarely extending below the top of the seed cavity; often persistent on the tree until well into the winter.

TWIGS—Stout, smooth, shiny, dark green to purplish-green. Terminal bud dark brown, slightly downy; lateral buds smaller, the first pair set on the same level as the terminal bud.

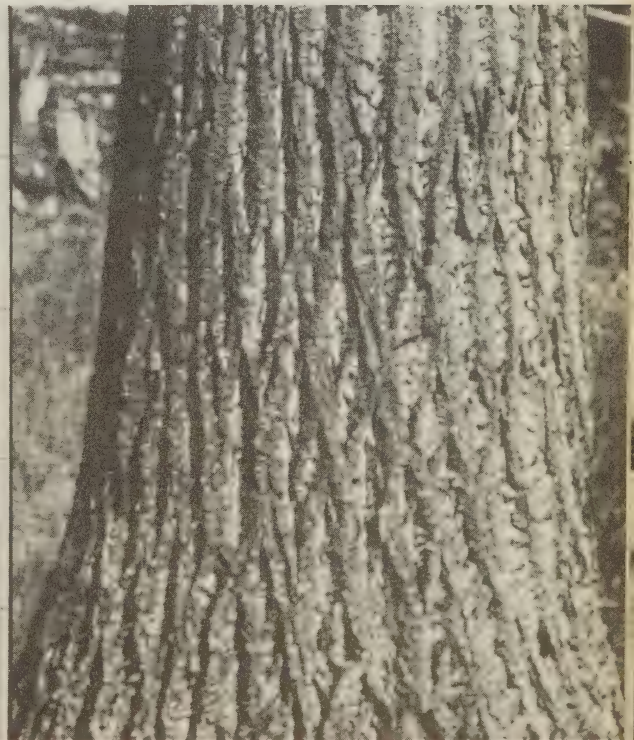
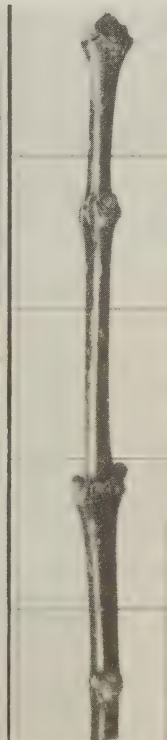
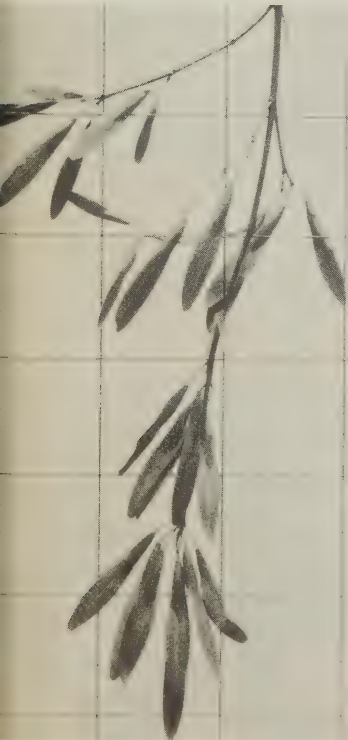
BARK—Grey or brownish; on old trunks furrowed into flattened, interlacing ridges.

WOOD—Heavy, hard, strong, close-grained, ring-porous; light brown with paler sapwood.

White ash timber is valued for its toughness and resilience. It is used in the framework of light vehicles, and for skis, long tool handles, and bentwood construction. The wood is tasteless and free from odour and is valuable for food containers. The tree is occasionally planted for shade and ornamental purposes.



COMPOUND LEAVES



FRUIT (SAMARAS)

WINTER TWIG

MATURE BARK

THE ASHES

BLACK ASH

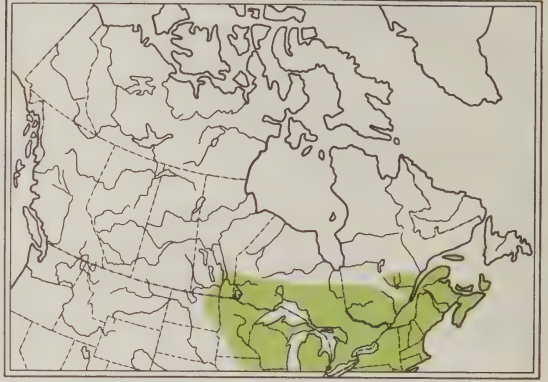
Fraxinus nigra Marsh.

Swamp ash, water ash, brown ash, hoop ash.

The black ash is usually a slender, medium-sized tree from 40 to 60 feet in height and 1 to 2 feet in diameter, sometimes in favourable situations reaching a maximum height of about 90 feet. The trunk is slender for its height and normally extends nearly to the top of the tree. The narrow, rather open crown is formed of slender, mostly upright branches.

In Canada the black ash is distributed from the Gulf of St. Lawrence westward to Camp Morton and Gimli on the west side of Lake Winnipeg. It is very intolerant of shade and as a rule is confined to wet sites along rivers, the margins of swamps, and small brook bottoms. It grows singly in open stands of eastern white cedar and balsam fir, or with red maple and other swamp hardwoods, and as a scattered tree in thickets of speckled alder or willow.

This ash is easily recognized by its stemless (sessile) leaflets, dark brown to almost black winter buds, and soft, scaly bark.



LEAVES—Opposite, compound, 10 to 16 inches long, composed of 7 to 11 stemless leaflets borne in pairs on a stout stem. Leaflets lance-shaped, fine-toothed, 3 to 5 inches long; dark green above, paler, smooth except for tufts of hair along the midvein below.

FLOWERS—May-June, before the leaves; unisexual and bisexual, male and bisexual flowers on the same or on different trees.

FRUIT—Early autumn; an oblong samara, 1 to 1½ inches long, the thin wing extending to the base of the seed cavity; shed during the autumn and early winter.

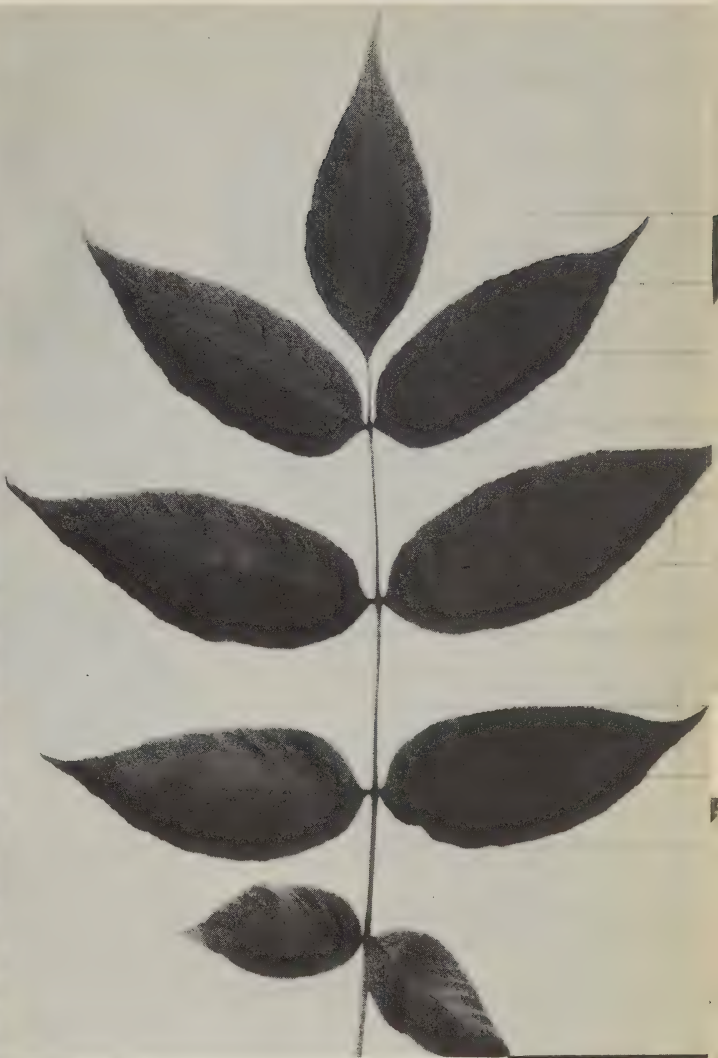
TWIGS—Stout, smooth, light grey. Terminal bud dark brown to almost black; lateral buds smaller.

BARK—On young stems, grey, slightly roughened; on older trunks greyish, scaly, shallow-furrowed into soft ridges.

WOOD—Moderately heavy and hard, not strong, ring-porous; dark brown with paler or almost white sapwood.

Because of its usually slow growth, black ash is seldom as strong or as hard as white ash and is therefore used chiefly for decorative purposes, where its attractive figure is important. It is also used for interior finish, fixtures, and cabinet-work. The Indians soften the wood by soaking it in water, separate it into long strips, and weave these into baskets and hampers of various kinds.

BLACK ASH



▲ MATURE
BARK

▲ COMPOUND
LEAF

FRUIT
(SAMARAS)



WINTER
TWIG ▶



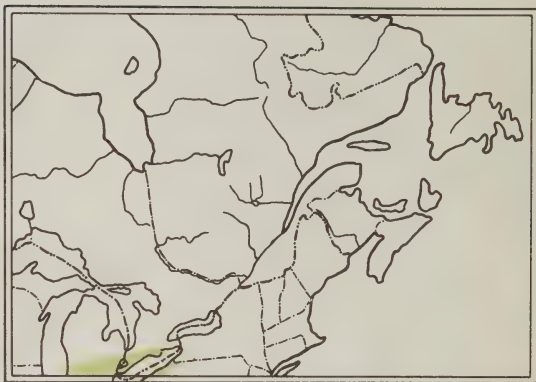
BLUE ASH

Fraxinus quadrangulata Michx.

The blue ash is a medium-sized tree in Canada. Under favourable conditions it may reach a height of 60 to 70 feet or over, but usually is considerably less. The diameter of the trunk is small for a tree of its height, seldom more than about 1 foot, and the taper is very slight. The narrow, round-topped crown is composed of slender, mostly spreading branches.

This ash is confined in Canada to southern Ontario in the counties bordering on Lake Erie and Lake St. Clair. It is usually found on the dry soils of limestone ridges, but makes its best growth on fertile bottom-lands. It rarely, if ever, forms pure stands, occurring chiefly with various oaks and hickories, white ash, rock elm, butternut, and red-bud.

The twigs and branchlets are important distinguishing features. They are rather heavy and more or less 4-sided in cross-section. No other native ash has this characteristic. When cut, the bark exudes a resinous juice which turns bluish on exposure, hence the name blue ash.



LEAVES—Opposite, compound, 8 to 12 inches long, composed of 5 to 11 short-stalked leaflets borne in pairs on a smooth, slender stem. Leaflets lance-shaped, coarse-toothed, 3 to 5 inches long; yellow-green above, paler and smooth except for tufts of hair along the veins below.

FLOWERS—Spring, with the leaves; bisexual; clustered on a central stalk.

FRUIT—Autumn; an oblong samara, 1 to 2 inches long, the thin wing rounded or notched, extending to the base of the seed cavity; falling at maturity.

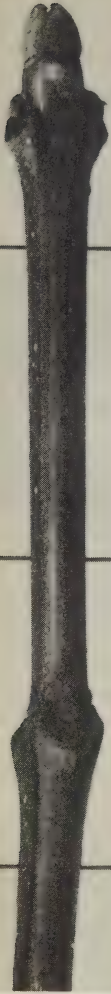
TWIGS—Stout, more or less 4-sided, grey to greyish-brown, hairy at first, smooth later. Terminal bud reddish-brown, slightly hairy; laterals smaller.

BARK—Thin, light grey; on older trees broken into large scaly plates.

WOOD—Heavy, hard, close-grained, ring-porous; yellowish-brown with thick paler sapwood.

The scarcity of this species makes it of little commercial importance in Canada. The wood may be used for the framework of light vehicles, aircraft construction, skis, and bentwood construction.

BLUE ASH



WINTER TWIG

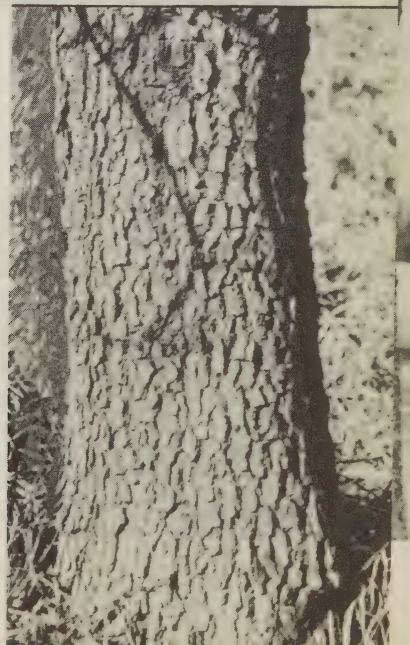


COMPOUND LEAF



FRUIT (SAMARA),
ENLARGED TWICE

MATURE
BARK



THE ASHES

RED ASH

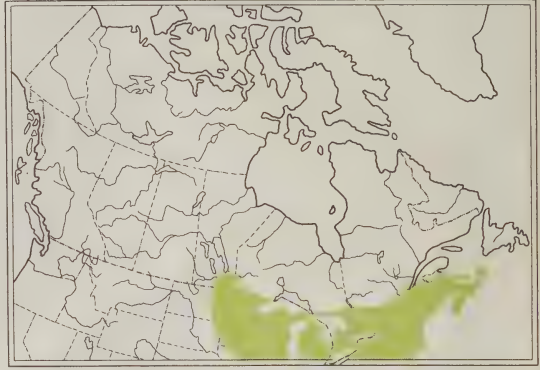
Fraxinus pennsylvanica Marsh.

Soft ash, river ash, brown ash, rim ash.

The red ash and the northern red ash, *Fraxinus pennsylvanica* Marsh. var. *austini* Fern., are separated by such minor characteristics that for convenience they are treated together. Both are small to medium-sized trees, commonly 30 to 40 feet in height and up to 18 inches in diameter. The maximum size is about 85 feet high and 2½ feet in diameter. The trunks are usually short, and bear compact irregular crowns of slender, mostly ascending branches. The root system is usually small and weak, and seldom penetrates far into the ground.

Red ash is confined in Canada to southern Ontario. Northern red ash has a much wider distribution, being found from Cape Breton Island westward to the south end of Lake Winnipeg. Both are found on moist sites along streams, on the margins of swamps, and on hillsides, where they grow with other hardwoods. Pure stands are unknown.

The red ashes are easily separated from our other species by the more or less hairy twigs and leaf stalks. Red ash is distinguished by its entire or wavy-edged, rarely toothed, leaflets, and by its fruit, which is longer than that of any other Canadian ash. The leaflets of northern red ash are commonly toothed and the fruit is much shorter.



LEAVES—Opposite, compound, 10 to 12 inches long, composed of 7 to 9 short-stalked leaflets borne in pairs on a stout, hairy stem. Leaflets lance-shaped, commonly entire or wavy-edged, rarely toothed (var. *austini* commonly toothed), 4 to 6 inches long; dull yellow-green above, paler and more or less hairy, below.

FLOWERS—May, before or with the leaves; unisexual; male and female borne in clusters usually on separate trees.

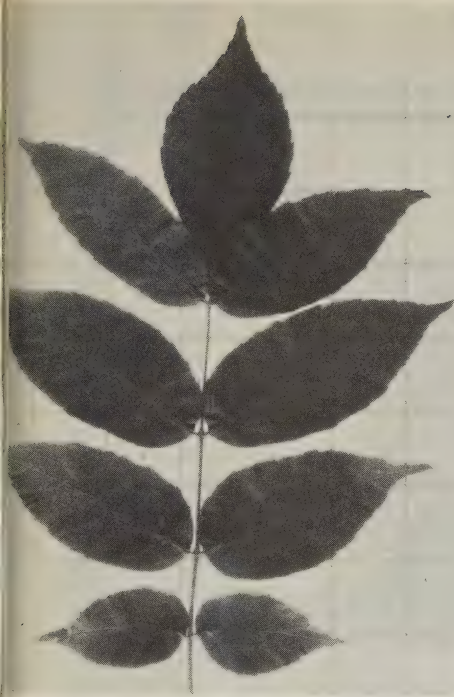
FRUIT—Autumn; an elongated samara, 1½ to 3 inches long (var. *austini* 1 to 1½ inches long), the thin flat wing rounded or slightly notched, gradually narrowing, extending to the middle or almost to the base of the seed cavity; shed in the autumn or early winter.

TWIGS—Stout, more or less hairy, light grey. Terminal bud reddish-brown, quite hairy; lateral buds smaller.

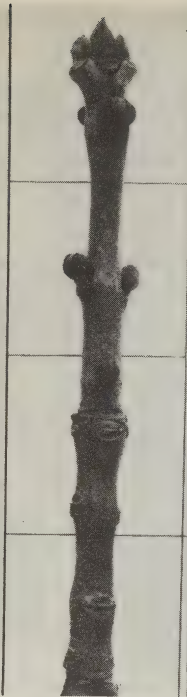
BARK—Brown tinged with red, shallow-furrowed into narrow, scaly ridges.

WOOD—Heavy, hard, moderately strong, coarse-grained, ring-porous, light brown with thick, paler sapwood.

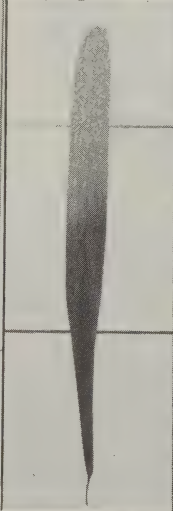
The wood of the red ashes may be used as a substitute for white ash for aircraft construction, skis, long tool handles and bentwood construction. It is weaker and more brittle than white ash and is more prone to defects.



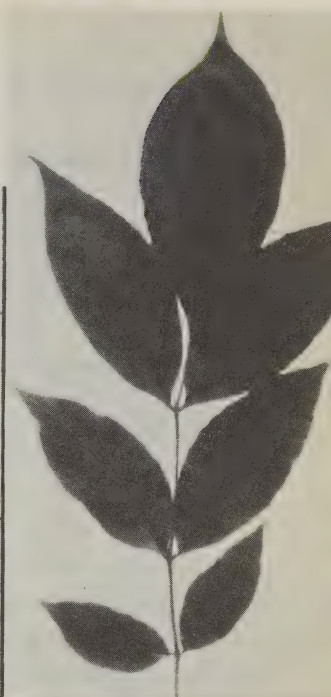
NORTHERN RED ASH LEAF



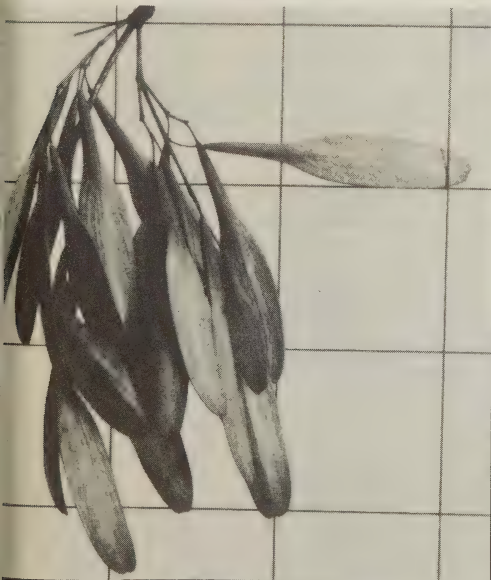
NORTHERN
RED ASH
WINTER
TWIG



RED ASH FRUIT
(SAMARA)



RED ASH LEAF



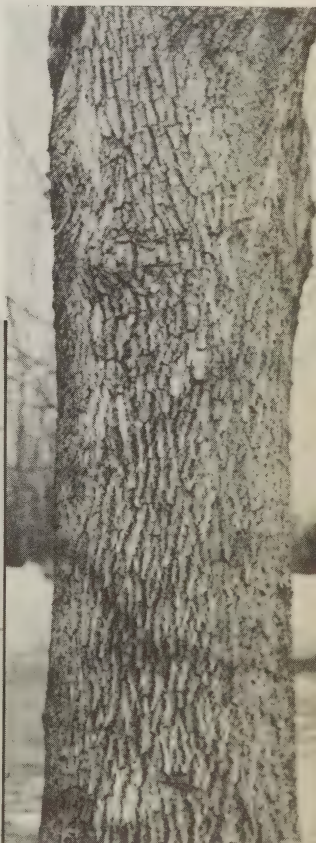
NORTHERN
RED ASH
FRUIT
(SAMARAS)



PARTIALLY OPENED MALE FLOWERS



PARTIALLY OPENED
FEMALE FLOWERS



MATURE BARK

THE ASHES

GREEN ASH

Fraxinus pennsylvanica Marsh.
var. *subintegerrima* (Vahl) Fern.

Prairie ash, lance-leaved ash, hillside ash,
river ash, white ash, red ash.

The green ash is recognized as being a variety of the red ash. It is a small tree, commonly 30 to 40 feet in height, rarely over 60 feet, with a slender trunk up to 2 feet in diameter. In the forest the trunk is tall and straight, and frequently extends well up into the short crown. In the open the trunk is shorter and the crown often reaches to within a few feet of the ground. The root system is usually shallow on dry and very wet sites, becoming somewhat deeper on moist locations.

In Canada the green ash is distributed from southwestern Quebec to Georgian Bay in Ontario, also from the west side of Lake Superior across southern Saskatchewan to eastern Alberta. It usually grows on the banks of streams and moist bottom-lands, but is sometimes found on the drier uplands. It is a fast-growing tree and quite hardy, and on this account is extensively used in prairie towns and cities for ornamental planting.

The green ash differs from the red ashes mainly in the lack of hair on its twigs and leaf stems. The leaves are usually a bright shiny green on both sides, whereas those of the red ashes are generally dull green.



LEAVES—Opposite, compound, 8 to 12 inches long, composed of 7 to 9 short-stalked leaflets borne in pairs on a stout, smooth stem. Leaflets lance-shaped, coarse-toothed, 4 to 6 inches long; bright shiny green above, paler, usually shiny, smooth, or with a few hairs on the mid-vein, below.

FLOWERS—May, before or with the leaves; unisexual; male and female borne in reddish clusters nearly always on different trees.

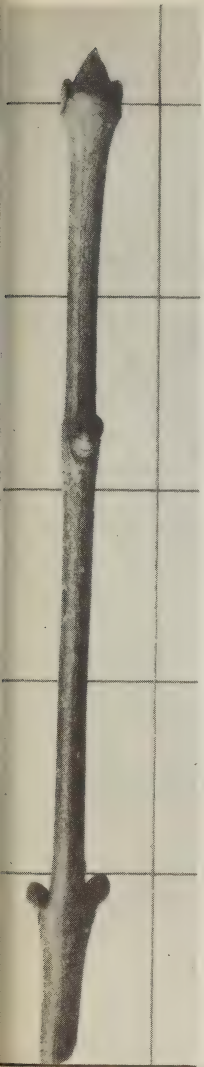
FRUIT—Autumn; an elongated samara, 1 to 1¾ inches long, the thin flat wing usually rounded, gradually narrowing, extending to the middle or nearly to the base of the seed cavity; shed during the autumn and early winter.

TWIGS—Stout, smooth, light grey. Terminal bud reddish-brown, somewhat hairy; lateral buds smaller.

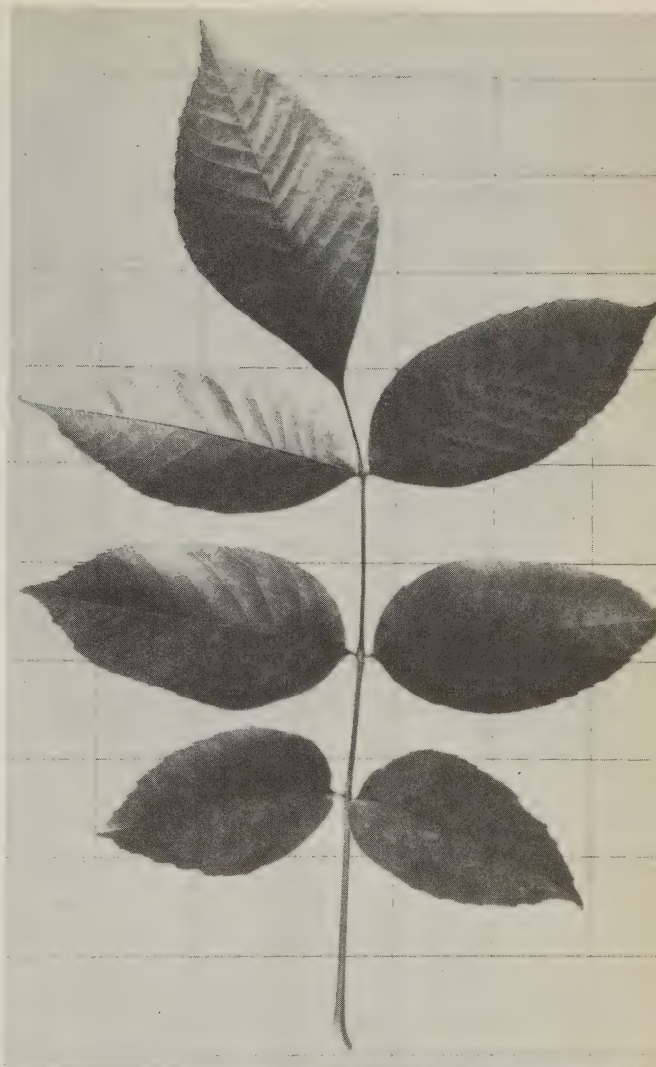
BARK—Greyish-brown, furrowed into soft, scaly ridges.

WOOD—Heavy, hard, moderately strong, coarse-grained, ring-porous; light brown with paler sapwood.

The wood closely resembles that of the white ash and, when of a suitable size and quality, may be used along with white ash for the framework of light vehicles, skis, long tool handles, and bentwood construction.



WINTER
TWIG



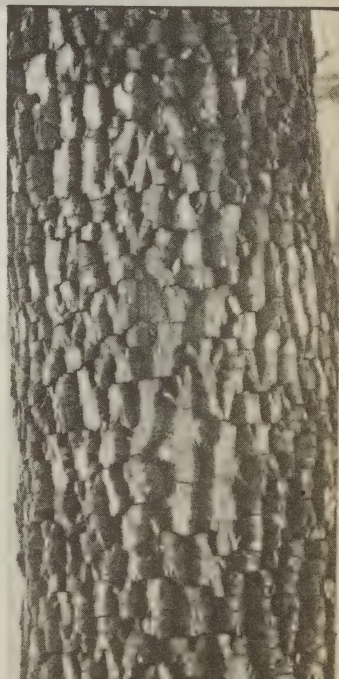
COMPOUND
LEAF



FRUIT
(SAMARAS)



MATURE
BARK



BLUEBERRY ELDER

Sambucus glauca Nutt.

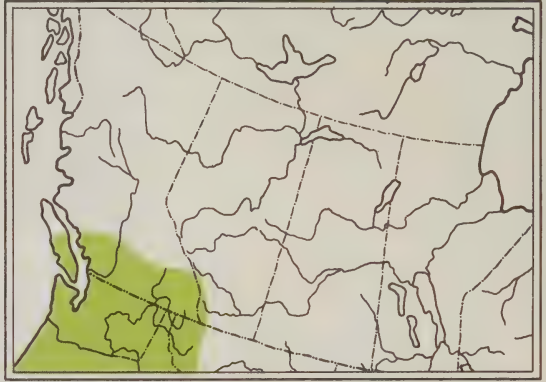
Common elderberry, elder, mountain elder, blue elderberry.

The blueberry elder is commonly a large shrub or small tree, 10 to 20 feet high, with a straight slender trunk 4 to 8 inches in diameter, often growing in clumps of several stems all from the same root system. Occasionally it is 25 to 30 feet high and 10 inches or more in diameter. The dense spreading crown of stout branches is round-topped throughout the life of the tree.

This species is found from southwestern Alberta, the mainland of southern British Columbia, and Vancouver Island southward to New Mexico and southern California. It makes its best growth on porous gravelly soils in mountain valleys, on low slopes, and along river bottoms. It is commonest near the coast, rather rare in the interior, and is scattered in association with Douglas fir, ponderosa pine, arbutus, red alder, and broadleaf maple.

. . .

About 20 species of *Sambucus* L. are found throughout the world. They are all small trees or shrubs, rarely of any importance except for ornamental planting. Of the 5 elders native to Canada, only 1 species, the blueberry elder, reaches tree size.



LEAVES—Opposite, compound, 5 to 7 inches long, composed of 5 or more stalked leaflets borne in pairs on a stout, grooved stem. Leaflets oval in outline, long-pointed, coarse-toothed, 1 to 6 inches long; bright green above, paler, sometimes downy, below.

FLOWERS—June-July; bisexual; creamy-white, about 1/8 of an inch in diameter, borne in broad, much-branched, flat-topped clusters.

FRUIT—Late summer; rounded, berry-like, about 1/3 of an inch in diameter, bluish-black, covered with a whitish bloom, sweet, edible.

TWIGS—Stout, somewhat angled, hairy during the first year, shiny, red-brown, with large, soft, whitish pith. Terminal bud seldom found; lateral buds large with greenish scales.

BARK—Dark brown, scaly, irregularly furrowed into narrow, intersecting ridges.

WOOD—Light, soft, not strong, coarse-grained, diffuser-porous; brownish-yellow with paler sapwood.

Elder wood is of no economic importance. The fruit is food for bird and man, and the tree is sometimes planted for ornamental purposes.

BLUEBERRY ELDER



COMPOUND LEAF



FRUIT CLUSTER



INDEX

NAME REFERENCES IN BOLD FACE TYPE

- Abies* 62
amabilis 68
balsamea 64
balsamea var. *phanerolepis* 64
grandis 70
lasiocarpa 66
- Acacia, Three-thorned 232
- Acer* 240
circinatum 248
ginnala 240
glabrum 246
glabrum var. *douglasii* 246
macrophyllum 250
negundo 260
negundo var. *interius* 260
nigrum 254
pensylvanicum 244
platanoides 240
pseudoplatanus 240
rubrum 256
saccharinum 258
saccharinum var. *laciniatum* 258
saccharum 252
spicatum 242
tataricum 240
- Aesculus hippocastum* 156
- Alder 142, 144, 148
black 142
green 142, 144, 152
grey 144
hoary 144
mountain 142, 148, 150, 152
northern 152
Oregon 146
red 142, 146
Sitka 142, 152
smooth 142
speckled 142, 144
thinleaf 150
western 146
white 142, 148
- Almond 216
- Alnus* 142
crispa 142
Alnus crispa subsp. *sinuata* 152
glutinosa 142
rhombifolia 148
rubra 146
rugosa 144
rugosa var. *americana* 144
serrulata var. *vulgaris* 142
sinuata 152
tenuifolia 150
- Amelanchier* 212
alnifolia 212
arborea 212
florida 212
laevis 212
- Apple 204
common 204
wild 204
- Apricot 216
- Arbor-Vitae 72
American 74
giant 72, 76
white 72, 74
- Arbutus 87, 270
- Arbutus* 270
menziesii 270
- Ash 272
American 274
black 272, 275, 276
blue 272, 278
brown 276, 280
Canadian white 274
European 272
green 272, 282
hillside 282
hoop 276
lance-leaved 282
northern red 272, 280
Oregon 272
prairie 282
red 272, 280, 282
rim 280
river 280, 282
soft 280
swamp 276
water 276
white 272, 274, 282
- Asimina* 196
triloba 196
- Asp 90
quaking 90
- Aspen 88
bigtooth 92
largetooth 88, 92
trembling 88, 90, 92
- Balm 94
of Gilead 94
western 96
- Balsam 64
western 66, 70
white 66
- Barberry 262
- Basswood 86, 264
- Bearberry 262
- Beech 124, 154
American 154
blue 124
red 154
water 124
- Betula* 128
alba 128

INDEX—Con.

NAME REFERENCES IN BOLD FACE TYPE

- Betula*
caerulea-grandis.....128, 138
kenaica.....128
lenta.....132
lutea.....130
occidentalis.....140
papyrifera.....134
papyrifera var. *commutata*.....136
papyrifera var. *cordifolia*.....134
papyrifera var. *elobata*.....134
papyrifera var. *humilis*.....134
papyrifera var. *macrostachya*.....134
papyrifera var. *pensilis*.....134
papyrifera var. *subcordata*.....136
pendula.....128
populifolia.....138
pubescens.....128
- Birch.....128, 134, 136
Alaska white.....134
black.....130, 132, 136, 140
blueleaf.....128, 138
British Columbia.....136
canoe.....134
cherry.....132
curly.....130
European white.....128
European silver.....128
grey.....138
gold.....130
hard.....130
Kenai.....128
mountain.....140
mountain white.....134
northwestern white.....136
paper.....134
poplar-leaved.....138
red.....130, 132, 140
silver.....138, 130, 134
swamp.....138
sweet.....128, 132
tall.....130
water.....128, 138, 140
western.....136
weeping white.....134
western white.....136
white.....86, 128, 134, 136, 138
wire.....128, 138
yellow.....128, 130, 132
- Bitternut.....116
- Black Gum.....266
- Blackthorn.....216
- Blue-beech.....124
- Box-elder.....260
inland.....260
- Boxwood.....268
- Buckthorn.....262
alderleaf.....262
cascara.....262
- Bullace.....216
- Butternut.....108, 110
- Button Ball.....202
- Buttonwood.....202
- Carpinus*.....124
caroliniana var. *virginiana*.....124
- Carya*.....114
cordiformis.....116
glabra.....120
laciniosa.....114
ovalis.....114
ovalis var. *odorata*.....114
ovata.....118
ovata var. *fraxinifolia*.....118
tomentosa.....122
- Cascara.....262
- Castanea*.....156
dentata.....156
- Cedar.....74
Alaska.....78
British Columbia.....76
British Columbia red.....76
canoe.....78
eastern.....74
eastern white.....72, 74
giant.....76
northern white.....74
pencil.....82
red.....76, 82, 84
Rocky Mountain red.....84
western.....76
western red.....49, 72, 76
yellow.....72, 78
- Cedrus*.....72
- Celtis*.....180, 188
occidentalis.....188
- Cercis*.....250
canadensis.....230
- Chamaecyparis.....78
- Chamaecyparis*.....72, 78
nootkatensis.....78
- Cherry.....216
bird.....220
bitter.....216, 224
black.....216, 218
black choke.....222
choke.....216, 217, 222
fire.....220
mahaleb.....216
mazzard.....216
pigeon.....220
pin.....216, 220, 224
red.....220
red choke.....222
red-fruited choke.....222
rum.....218
sand.....216

INDEX—Con.

NAME REFERENCES IN BOLD FACE TYPE

- Cherry
sour.....216
sweet.....216
western choke.....222
wild.....222, 224
wild black.....218
wild red.....220
- Chestnut.....156
horse.....156
sweet.....156
- Coffee-tree.....234
Kentucky.....234
- Coffee Bean.....234
- Cornus*.....268
alternifolia.....268
drummondii.....268
florida.....268
nuttalli.....268
- Cottonwood.....88, 96, 98
balm.....96
balsam.....96
bitter.....102
black.....88, 96, 102
common.....98
eastern.....88, 98, 100
great plains.....100
lanceleaf.....88, 102, 104
narrowleaf.....88, 102, 104
plains.....88, 98, 100
river.....100
Rydberg's.....104
smoothbark.....104
western.....100
willow-leaved.....102
- Crab-apple.....204
Oregon.....204
Pacific.....204
sweet.....204
wild.....204
- Crataegus*.....214
chrysoarpa.....214
columbiana.....214
douglasii.....214
monogyna.....214
oxyacantha.....214
- Cucumber-tree.....192
- Cucumber Magnolia.....192
- Custard-apple.....196
- Cypress.....16, 24
Alaska.....78
Nootka.....78
yellow.....78
- Damson.....216
- Dogwood.....268
alternate-leaf.....268
eastern flowering.....268
Pacific.....268
- Dogwood
roughleaf.....268
western flowering.....268
- Douglas Fir.....56, 58
blue.....56, 60
mountain.....60
Rocky Mountain.....60
- Elder.....284
blueberry.....284
mountain.....284
- Elderberry.....284
blue.....284
common.....284
- Elm.....180, 188
American.....182
bastard.....188
budded.....184
Chinese.....180
cork.....186
cork-barked.....186
English.....180
hickory.....186
red.....184
rock.....180, 182, 184, 186
Scotch.....180
Siberian.....180
slippery.....180, 184
slippery-barked.....184
soft.....184
swamp.....182
water.....182
white.....86, 180, 182, 184, 186
wych.....180
- False Banana.....196
- Fagus*.....154
grandifolia.....154
- Fir.....62, 64
alpine.....66, 66, 68
amabilis.....62, 68
balsam.....62, 64, 68
bracted balsam.....64
British Columbia.....58
Canadian.....64
Caribou.....66
Cascade.....68
Douglas.....56
giant.....70
grand.....62, 68, 70
lovely.....68
lowland.....70
lowland white.....70
mountain.....66
red.....58, 68
Rocky Mountain.....66
silver.....62, 68, 70
western balsam.....66
white.....64, 66, 68, 70
yellow.....58
- Fraxinus*.....272
americana.....274
excelsior.....272
nigra.....276

INDEX—Con.

NAME REFERENCES IN BOLD FACE TYPE

- Fraxinus*
oregona 272
pennsylvanica 280
pennsylvanica var. *austini* 280
pennsylvanica var. *subintegerrima* 282
quadrangulata 278
- Gleditsia* 232
triacanthos 232
- Ground Hemlock 2
- Gum, Black 266
- Gymnocladus* 234
dioica 234
- Hackmatack 28
- Hackberry 180, 188
- Hamamelis* 200
virginiana 200
- Hawthorn 214
black 214
Columbia 214
English 214
one-seeded 214
roundleaf 214
- Hemlock 48, 50, 52
black 54
British Columbia 52
Canadian 50
eastern 48, 50
false 56
ground 2
mountain 48, 54
western 48, 52
white 50
- Hickory 108, 114
ashleaf shagbark 118
bigbud 122
bitternut 114, 116
black 120
brown 120
mockernut 114, 122
pignut 114, 120
red 114
roundnut red 114
shagbark 114, 118
shellbark 114, 118
swamp 116
whiteheart 122
- Honey-locust 232
- Hop-hornbeam 124, 126
- Hornbeam 124, 126
- Hop-tree 236
- Horse-chestnut 156
- Ironwood 124, 126
rough-barked 126
smooth-bark 124
- Jasmine 196
- Judas-tree 230
- Juglans* 108
cinerea 110
nigra 112
regia 108
sieboldiana 108
- Juneberry 212
roundleaf 212
- Juniper 16, 28, 80, 82
common 80
creeping 80
dwarf 80
pencil 82
red 80, 82, 84
Rocky Mountain 80, 84
western 84
- Juniperus* 72, 80
communis 80
horizontalis 80
scopulorum 84
virginiana 82
- Kentucky Coffee-tree 234
- Larch 1, 26, 28, 30, 68, 70
Alaska 28
alpine 26, 32
American 28
black 28
European 26
Lyall's 32
mountain 32
Siberian 26
western 26, 30
- Larix* 26
decidua 26
laricina 28
laricina var. *alaskensis* 28
lyallii 32
occidentalis 30
sibirica 26
- Lime 264
- Lime-tree 264
- Linden, American 264
- Linden, Quebec 264
- Liriodendron* 194
tulipifera 194
- Locust, sweet 232
- Locust, thorny 232
- Madrona 270
- Madrone 270
- Magnolia* 192
acuminata 192
- Magnolia* 192
cucumber 192
pointed-leaved 192

INDEX—Con.

NAME REFERENCES IN BOLD FACE TYPE

Malus 204
coronaria 204
fusca 204
pumila 204

Manzanita 270

Maple 240
 Amur 240
 ash-leaf 260
 bigleaf 250
 bird's eye 240, 252
 black 240, 252, 254
 British Columbia 250
 broadleaf 240, 250
 broad-fruited 258
 curly 240, 252
 cutleaf 258
 Douglas 240, 246
 dwarf 242, 246
 hard 252, 254
 Inland Manitoba 260
 Manitoba 240, 260
 moose 244
 mountain 240, 242, 246, 248
 Norway 240
 Oregon 250
 red 86, 240, 246, 256
 river 258
 rock 252, 254
 Rocky Mountain 246
 scarlet 256
 silver 240, 258
 soft 256, 258
 striped 240, 244
 sugar 86, 240, 252, 254
 swamp 256, 258
 sycamore 240
 Tatarian 240
 vine 240, 248
 water 256, 258
 weeping 258
 white 242, 258
 Wier 258

May 214

Moosewood 244

Morus 190
alba 190
rubra 190

Mountain-ash 206, 208, 210
 American 206, 210
 European 206
 hybrid 207
 showy 206, 208

Mulberry 190
 black 190
 red 190
 white 190

Nettle-tree 188

Nyssa 266
sylvatica 266

Oak 158, 170
 black 158, 172, 174, 176
 blue 162, 164
 bur 158, 162
 British Columbia 170
 chinquapin 158, 168
 chestnut 158, 166, 168
 durmast 158
 dwarf chinquapin 158, 168
 English 158
 Garry 158, 170
 mossycup 162
 mountain 166
 northern red 172
 northern pin 158, 178
 Oregon 170
 Oregon white 170
 overcup 162
 Pacific post 170
 Pacific white 170
 pin 158, 178
 post 158
 red 158, 172, 174, 176
 rock 166
 scarlet 158, 174, 176
 scrub 162
 Spanish 176
 stave 160
 swamp 178
 swamp white 158, 164
 water 178
 western white 170
 white 158, 160, 168, 170
 yellow 168, 174
 yellow-barked 174

Ostrya 126
virginiana 126

Papaw 196

Pawpaw 196

Peach 216

Pepperidge 266

Picea 34
abies 34
engelmanni 44
glauca 36
glauca var. *albertiana* 38
glauca var. *porsildii* 36
mariana 40
pungens 34
rubens 42
sitchensis 46

Pine 4, 36
 Alaska 52
 Austrian 4
 banksian 16
 black 24
 British Columbia 20
 bull 20
 Canadian red 14
 cork 6
 Douglas 58

INDEX—Con.

NAME REFERENCES IN BOLD FACE TYPE

Pine	
eastern white	4, 6
grey	16
Idaho white	8
jack	4, 14, 16, 18, 20, 24
limber	4, 8, 12
lodgepole	4, 16, 22, 24
mountain	4
mountain Weymouth	8
Mugho	4
Norway	14
Oregon	58
pattern	6
pitch	4, 18
ponderosa	4, 20
princess	16
pumpkin	6
Quebec	6
red	4, 14
rigid	18
Rocky Mountain	12
Rocky Mountain white	12
sapling	6
Scots	4
screw	22
scrub	10, 16, 18, 22
shore	4, 22
silver	8, 64
western jack	24
western white	4, 8
western yellow	20
Weymouth	6
white	6, 8, 24
whitebark	4, 8, 10
white-stemmed	10
yellow	6, 14, 20
<i>Pinus</i>	4
<i>albicaulis</i>	10
<i>banksiana</i>	16
<i>contorta</i>	22
<i>contorta</i> var. <i>latifolia</i>	24
<i>flexilis</i>	12
<i>monticola</i>	8
<i>mugho</i>	4
<i>nigra</i>	4
<i>ponderosa</i>	20
<i>resinosa</i>	14
<i>rigida</i>	18
<i>Strobus</i>	6
<i>sylvestris</i>	4
Plane-tree	202
<i>Platanus</i>	202
<i>occidentalis</i>	202
Plum	216
American	228
Canada	216, 226, 228
horse	226
red	226, 228
wild	216, 224, 226, 228
yellow	228
Poison Ivy	238
Poplar	88, 90, 92, 94
aspens	90
balm	94

Poplar	
balsam	88, 94, 96
black	94
Carolina	88
large-tooth	92
Lombardy	88
rough-barked	94
silver	88
smooth-barked	90
western balsam	96
white	88, 90
Popple	90
<i>Populus</i>	88
<i>acuminata</i>	104
<i>alba</i>	88
<i>alba</i> var. <i>nivea</i>	88
<i>angustifolia</i>	102
<i>balsamifera</i>	94
<i>balsamifera</i> var. <i>subcordata</i>	94
<i>deltoides</i>	98
<i>eugenei</i>	88
<i>grandidentata</i>	92
<i>nigra</i> var. <i>italica</i>	88
<i>sargentii</i>	100
<i>tremuloides</i>	90
<i>trichocarpa</i>	96
Prunes	216
<i>americana</i>	228
<i>avium</i>	216
<i>cerasus</i>	216
<i>domestica</i>	216
<i>emarginata</i>	224
<i>instiua</i>	216
<i>mahaleb</i>	216
<i>nigra</i>	226
<i>pensylvanica</i>	220
<i>pensylvanica</i> var. <i>saximontana</i>	220
<i>persica</i>	216
<i>pumila</i>	216
<i>serotina</i>	218
<i>spinosa</i>	216
<i>virginiana</i>	222
<i>virginiana</i> var. <i>demissa</i>	222
<i>virginiana</i> var. <i>melanocarpa</i>	222
<i>Pseudotsuga</i>	56
<i>taxifolia</i>	58
<i>taxifolia</i> var. <i>glauca</i>	60
<i>Ptelea</i>	236
<i>trifoliata</i>	236
<i>Quercus</i>	158
<i>alba</i>	160
<i>bicolor</i>	164
<i>coccinea</i>	176
<i>ellipsoidalis</i>	178
<i>garryana</i>	170
<i>macrocarpa</i>	162
<i>muehlenbergii</i>	168
<i>palustris</i>	178
<i>petraea</i>	158
<i>prinoides</i>	158, 168
<i>prinus</i>	166
<i>robur</i>	158
<i>rubra</i>	172

INDEX—Con.

NAME REFERENCES IN BOLD FACE TYPE

<i>Quercus</i>	
<i>stellata</i>	158
<i>velutina</i>	174
Redbud	230
Redcedar, Eastern	82
<i>Rhamnus</i>	262
<i>alnifolia</i>	262
<i>purshiana</i>	262
<i>Rhus</i>	238
<i>radicans</i>	238
<i>typhina</i>	238
Rowan Berry	206, 208, 210
Rowan Tree	206, 208, 210
<i>Salix</i>	106
<i>alba</i>	106
<i>amygdaloides</i>	106
<i>babylonica</i>	106
<i>fragilis</i>	106
<i>lasioandra</i>	106
<i>nigra</i>	106
<i>Sambucus</i>	284
<i>glauca</i>	284
Saskatoon	212
Sassafras	198
<i>Sassafras</i>	198
<i>albidum</i>	198
<i>Sassafrax</i>	198
<i>Saxifrax</i>	198
Serviceberry	212
Allegheny	212
downy	212
Pacific	212
Service Tree	208, 210
Shad-bush	212
Sloe	216
Snapping-hazel	200
<i>Sorbus</i>	206
<i>americana</i>	210
<i>aucuparia</i>	206
<i>cascadensis</i>	206
<i>decora</i>	208
<i>occidentalis</i>	206
<i>scopolina</i>	206
<i>sitchensis</i>	206
Sourgum	266
Spruce	34, 42
Alberta	38
black	34, 40, 42

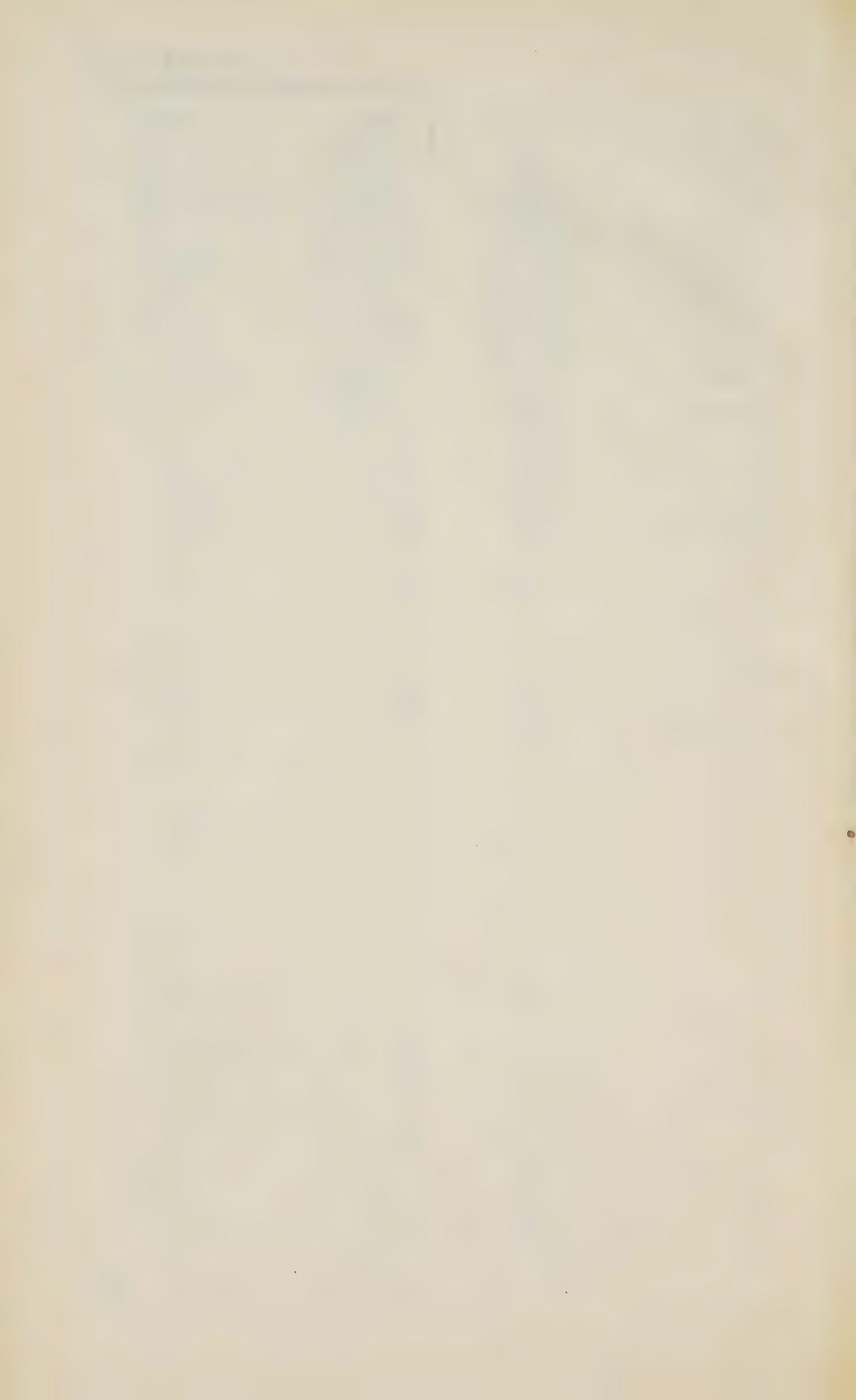
Spruce	
Black Hills	38
blue	34
cat	36
Colorado	34
coast	46
double	40
Douglas	58
Engelmann	34, 38, 44, 66
hemlock	50
Menzies	46
mountain	44
northern	36
Norway	34
Oregon	58
Porsild	36
red	34, 40, 42
Rocky Mountain	44
single	36
Sitka	34, 46
skunk	36
swamp	40
tideland	46
water	40
western white	34, 38, 44
white	34, 36, 38, 42, 64
yellow	36, 42
Sugarberry	188
Sumac	238
staghorn	238
Sycamore	202
Tacamahac	94
Tamarack	26, 28, 30, 32
western	30
<i>Taxus</i>	2
<i>brevifolia</i>	2
<i>canadensis</i>	2
<i>Thuja</i>	72
<i>occidentalis</i>	74
<i>plicata</i>	76
<i>Tilia americana</i>	264
<i>Tilia neglecta</i>	264
<i>Tsuga</i>	48
<i>canadensis</i>	50
<i>heterophylla</i>	52
<i>mertensiana</i>	54
Tulip-tree	194
Tupelo	266
black	266
<i>Ulmus</i>	180
<i>americana</i>	182
<i>glabra</i>	180
<i>procera</i>	180
<i>pumila</i>	180
<i>rubra</i>	184
<i>thomasi</i>	186

INDEX—Con.

NAME REFERENCES IN BOLD FACE TYPE

Var.....	64
Wafer-ash.....	236
Walnut.....	108, 112
American.....	112
American black.....	109, 112
black.....	108, 112
Circassian.....	108
English.....	108
European.....	108
Japanese.....	108
Persian.....	108
Siebold.....	108
white.....	110
Whitewood.....	194, 264

Willow.....	88, 106
black.....	106
crack.....	106
Pacific.....	106
peachleaf.....	106
weeping.....	106
white.....	106
Winter-bloom.....	200
Witch-hazel.....	142, 200
Yellow Cedar.....	78
Yellow-poplar.....	194
Yew.....	2
Canada.....	2
Pacific.....	2
western.....	2



640481
Gov.Doc. Canada. Northern Affairs and National Resources,
Can Dept. of. Forestry Branch
N Native trees of Canada. 5th ed.

UNIVERSITY OF TORONTO
LIBRARY

DO NOT
REMOVE
THE
CARD
FROM
THIS
POCKET



